GOLDWING

1998
GL1500 A/SE
ELECTRICAL
TROUBLESHOOTING MANUAL

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MSV 8022 (9803)

How To Use This Manual

Page Numbering System

This manual divides the electrical system into individual sections. For example, Section 5 includes all Chassis Accessories. Component Location photographs are at the back of the manual in Section 12.

Within a section, the pages are numbered using the section number, a dash, and then a consecutive number beginning with zero. So if there are three pages in Section 2, the pages will be numbered 2-0, 2-1, and 2-2.

Outline of Each Circuit Section

A **Circuit Schematic** (wiring diagram) starts off each section. Schematics show:

- how all the components within a circuit work together
- current flow from the power source (top of page) to ground (bottom of page)
- switch positions (shown "at rest" as if the ignition was off)
- special instructions ("Solid-state: Do not check resistance")
- those circuits sharing a common power source or ground

A **System Description** (How the Circuit Works) appears in some sections; it explains basic circuit operation.

A **Troubleshooting** guide also appears in some sections and provides step-by-step instructions for diagnosis and repair. It includes symptom and diagnosis charts and self-tests for all possible measurements in the system.

Model Abbreviations for 1998 used in this manual:

Asp – Aspencade
SE – Special Edition

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Symbols

The abbreviations and symbols explained here are used throughout the manual. You'll need to know what they mean before you can use the schematics effectively.

Wire Color Abbreviations

The following abbreviations are used to identify wire colors in the circuit schematics:

BLK	black
BLU	blue
BRN	brown
GRN	green
GRY	gray
LT BLU	light blue
LT GRN	light green
ORN	orange
PNK	pink
RED	red
WHT	white
YEL	yellow

Wires

A wavy line means the wire is broken by the binding of the book but continues on the next page.

Wire insulation can be one color, or one color with another color stripe; the second color is the stripe.

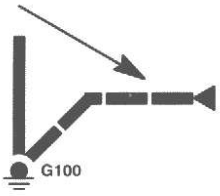
This means the current path continues on another page. The arrow shows direction of current flow. To follow the white wire in this example, you would turn to page 9-11 and look for the "R" arrow.

To S285 on page 9-11.

This means the branch of the wire connects to another circuit. The arrow points to the name of the circuit branch where the wire continues.

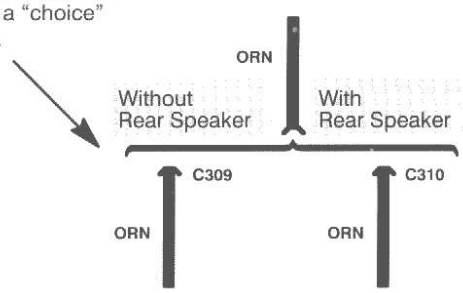
Name of Circuit

A broken line means only some of the circuit is shown; refer to the circuit listed for the complete schematic.

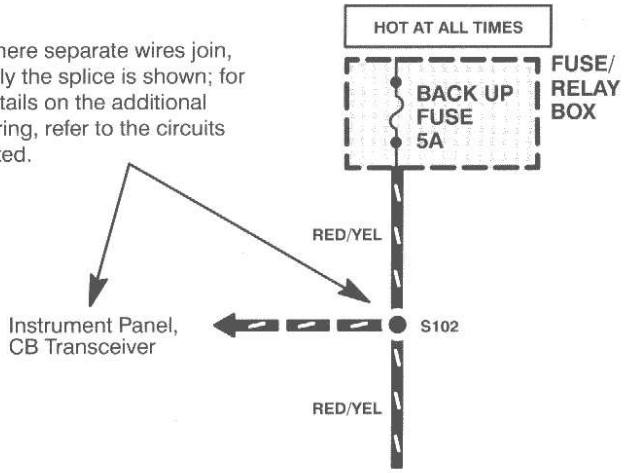


See Ground Distribution, page 2-10.

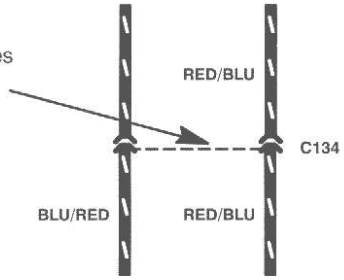
Wire choices for options or different models are labeled and shown with a "choice" bracket like this.



Where separate wires join, only the splice is shown; for details on the additional wiring, refer to the circuits listed.

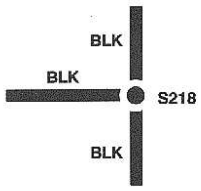


This dashed line means the BLU/RED and RED/BLU wires are both in connector C134.



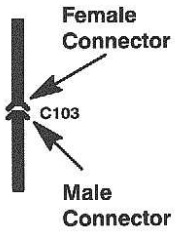
Splices — "S"

Splices (S) are numbered and shown as a dot. The location and connection of these splices may vary depending on the harness manufacturer.

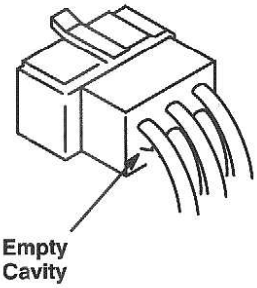


Connectors — "C"

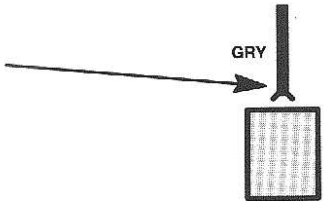
Each connector (C) is numbered for reference in the Component Location Index, Section 11.



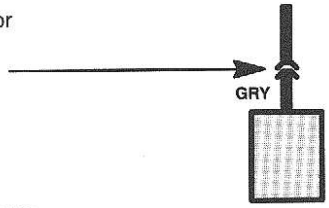
The index also lists the total number of cavities and the color of the connector. Wires may not be used in all cavities.



This means the connector connects directly to the component.



This indicates the connector connects to a lead (pigtail) wired directly to the component.



This indicates a screw terminal on the component.

Components

A solid border line means the entire component is shown.

A broken border line indicates that only part of the component is shown.

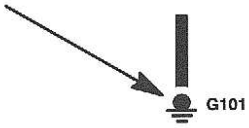
The name of the component appears next to its upper right corner.

Notes about component function follow its name.

BRAKE SWITCH
Closed with pedal depressed.

Ground — "G"

This symbol means the end of the wire is attached to a metal part of the motorcycle.



Each wire ground (G) is numbered for reference in the Component Location Index, Section 11.

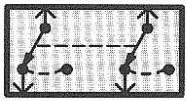
This ground symbol (dot and 3 lines) overlapping the component means the housing of the component is attached directly to a metal part of the motorcycle.

(cont'd)

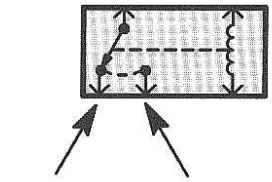
Symbols (cont'd)

Switches

These switches move together; a dashed line shows a mechanical connection between them.

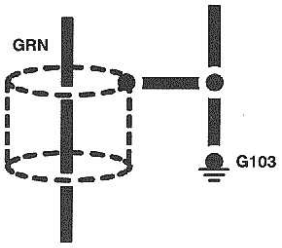


This is a relay shown with no current flowing through its coil. Unless otherwise noted, all switches are shown in their normal (rest) position, with power off.



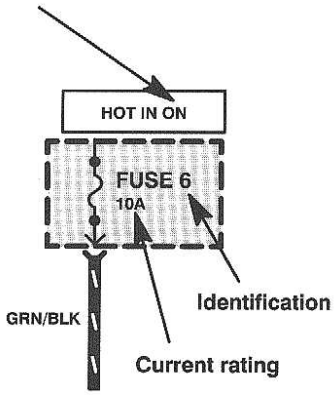
Shield

This represents RFI (Radio Frequency Interference) shielding around a wire. The shielding is always connected to ground.



Fuses

This means power is supplied when the ignition switch is in ON.



Diode

This diode allows current to flow only in the direction of the arrow.

Circuit Schematic (cont'd)

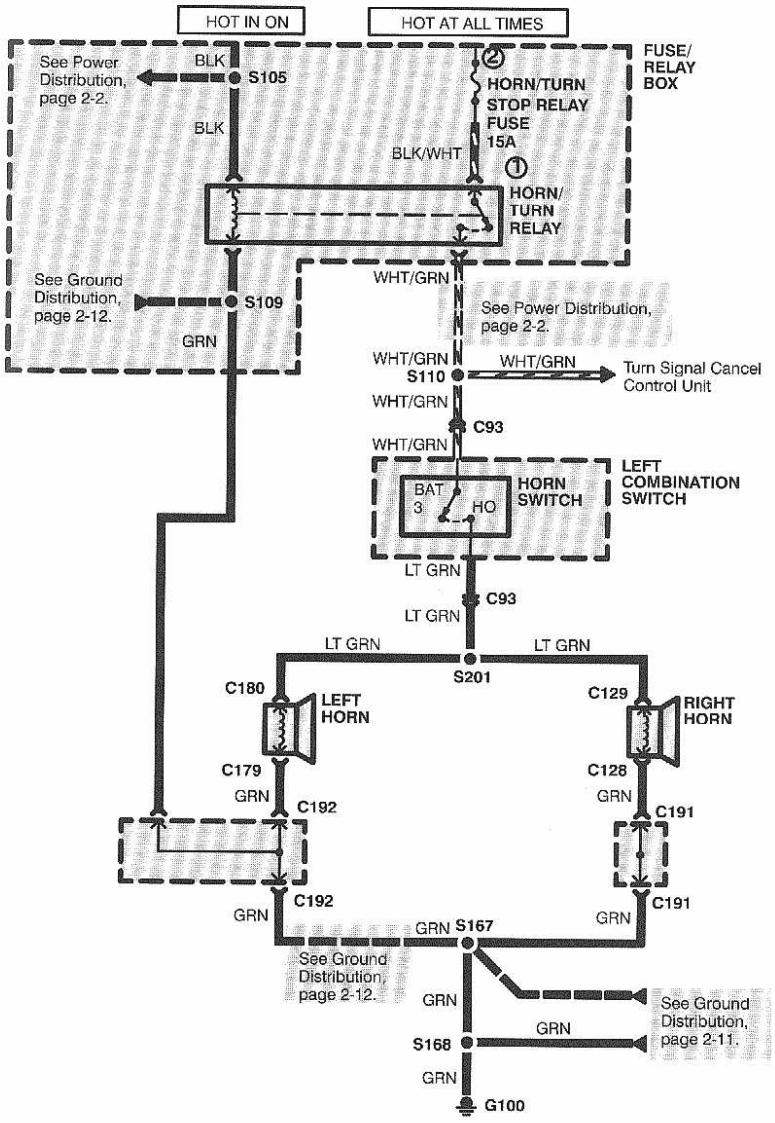
Circuit schematics break the entire electrical system into individual circuits. Electrical components that work together are shown together so that you are not distracted by wiring that is not part of the circuit you are working on.

Each drawing is arranged so current flows from positive, at the top of the page, to ground, at the bottom of the page. The "HOT" label at the top of a fuse shows when the ignition switch supplies power to that fuse.

Each circuit is shown completely and independently on one schematic. Other circuits getting their power from the same point, or grounding at the same point, are not shown. However, if other circuits actually share some wires with the circuit shown, the shared wires of the other circuits will also be shown.

Wires that connect to another circuit are shown with an arrowhead pointing in the direction of current flow. The name of the circuit or component that shares the wiring is provided for reference. You can check shared wiring by checking the operation of the other circuits.

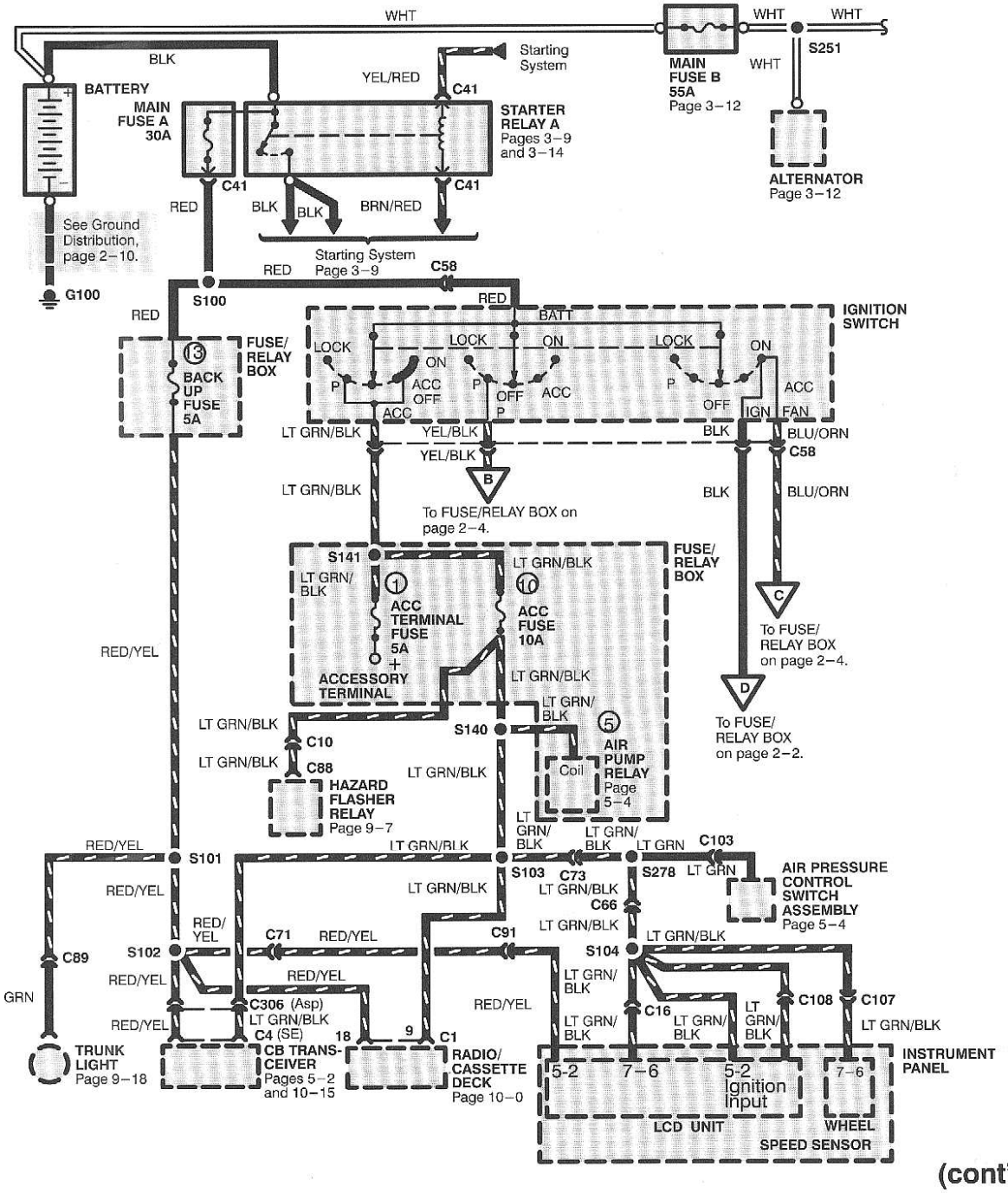
"See Power Distribution" means there are more connections to other circuits that are not shown. All such shared circuits are shown on the Power Distribution circuit schematic. "See Ground Distribution" means there are more shared ground circuits which are shown on the Ground Distribution schematic.



The sample Power Distribution schematic shows how voltage is supplied from the positive battery terminal to the various circuits in the motorcycle.

Individual circuit schematics begin with a fuse. Power Distribution shows the wiring between the battery and the fuses. By combining Power Distribution with any individual schematic, you get a complete picture of how voltage is applied to the circuit.

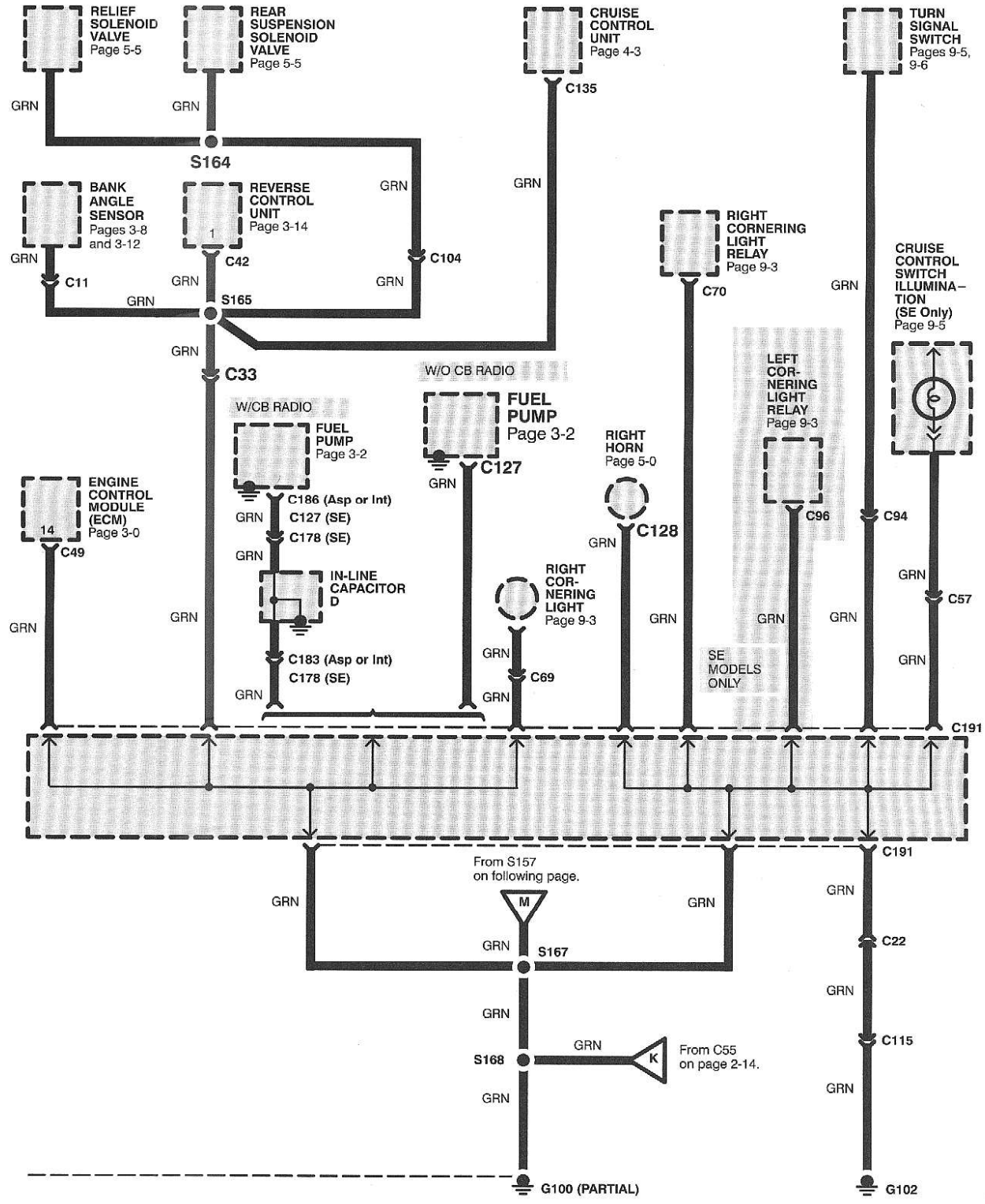
You can use Power Distribution to speed your troubleshooting. If Power Distribution shows that an inoperative circuit and a second circuit share a fuse, check the operation of the second circuit. If it works, you know the fuse is good and voltage is available to the inoperative circuit. You can then continue troubleshooting.



(cont'd)

Circuit Schematic (cont'd)

The sample Ground Distribution schematic shows which components share the same ground point.



Component Location

The Component Location Index (Section 11) lists every component, connector, and ground and describes its location on the motorcycle. This index also gives references to component location photographs which are found in Section 12.

Component Location Photographs (Section 12) show the exact location and appearance of components, connectors, and grounds.

The Component Index (Section 13) lists all components and gives page references to all circuit schematics in which each component appears.

Component Location Index (Section 11)

(Refer to Section 12 for photographs.)

Component	Photo No.
Auxiliary Input Connector	55
Behind left fairing pocket	
Bank Angle Sensor	32
Below right rear of seat, on frame rail	
C6 (3-BLK)	45
Behind instrument panel	
C10 (22-BLU) (SE)	38
Behind left rear of seat	
C10 (22-WHT) (Asp)	38
Below left rear of seat	

Component or Connector Number

Number of Cavities In Connector

Connector Color

Photo Number in Section 11

Component Index (Section 13)

Acc Fuse 10A 2-0, 5-2, 5-4, 7-6, 9-7, 10-0, 10-6, 10-15

Acc Terminal Fuse 5A 2-0

Accessory Terminal 2-0, 2-12

Air Pressure Control Switch Assembly 2-0, 2-4, 5-4, 5-5

Air Pressure Sensor 5-4

Air Pump Assembly 2-14, 5-5

Air Pump Fuse 10A 2-1, 5-4

Air Pump Relay 2-0, 2-1, 5-4

Five-Step Troubleshooting

1. **Verify The Complaint**

   Turn on all the components in the problem circuit to check the accuracy of the customer complaint. Note the symptoms. Do not begin disassembly or testing until you have narrowed down the problem area.

2. **Analyze The Schematic**

   Look up the schematic for the problem circuit. Determine how the circuit is supposed to work by tracing the current paths from the power source through the circuit components to ground. Also trace circuits that share wiring with the problem circuit. The names of circuits that share the same fuse, ground, or switch, and so on, are referred to on each circuit schematic. Try to operate any shared circuits you didn't check in step 1. If the shared circuits work, the shared wiring is OK, and the cause must be in the wiring used only by the problem circuit. If several circuits fail at the same time, the fuse or ground is a likely cause.

   Based on the symptoms and your understanding of the circuit's operation, identify one or more possible causes of the problem.

3. **Isolate The Problem By Testing The Circuit**

   Make circuit tests to check the diagnosis you made in step 2. Keep in mind that a logical, simple procedure is the key to efficient troubleshooting. Test for the most likely cause of failure first. Try to make tests at points that are easily accessible.

4. **Fix The Problem**

   Once the specific problem is identified, make the repair. Be sure to use proper tools and safe procedures.

5. **Make Sure The Circuit Works**

   Turn on all components in the repaired circuit in all modes to make sure you've fixed the entire problem. If the problem was a blown fuse, be sure to test all of the circuits on that fuse. Make sure no new problems turn up and the original problem does not recur.

Test Equipment

Voltmeter and Test Light

CAUTION: A number of circuits include solid-state devices. Voltages in these circuits should be tested only with a 10-megohm or higher impedance digital multimeter. Never use a test light on circuits that contain solid-state devices. Damage to the devices may result.

On circuits without solid-state devices, use a test light to check for voltage. A test light is made up of a 12-volt bulb with a pair of leads attached. After grounding one lead, touch the other lead to various points along the circuit where voltage should be present. The bulb will go on if there is voltage at the point being tested.

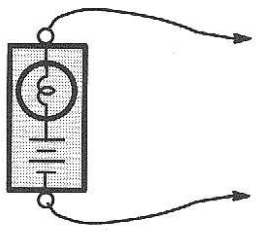
A voltmeter can be used in place of a test light. While a test light shows whether or not voltage is present, a voltmeter indicates how much voltage there is.

Self-Powered Test Light and Ohmmeter

CAUTION: Never use a self-powered test light on circuits that contain solid-state devices. Damage to these devices may result.

Diodes and solid-state devices in a circuit can make an ohmmeter give a false reading. To find out if a component is affecting a measurement, take one reading, reverse the leads, and take a second reading. If the readings differ, the component is affecting the measurement.

An ohmmeter can be used in place of a self-powered test light. The ohmmeter shows how much resistance there is between two points along a circuit. Low resistance means good continuity.



Self-Powered Test Light

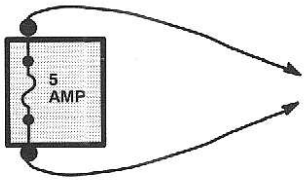
Circuits that contain solid-state devices should only be tested with a 10-megohm or higher impedance digital multimeter.

Use a self-powered test light to check for continuity. This tool is made up of a light bulb, battery and two leads. If the leads are touched together, the bulb will go on.

A self-powered test light is only used on an unpowered circuit. First disconnect the battery or remove the fuse that feeds the circuit you are working on. Select two points along the circuit through which there should be continuity. Connect one lead of the self-powered test light to each point. If there is continuity, the test light's circuit will be completed and the bulb will go on.

Jumper Wire

Use a jumper wire to bypass an open circuit. A jumper wire is made up of an in-line fuse holder connected to a set of test leads. It should have a five ampere fuse. Never use a jumper wire across any load. This direct battery short will blow the fuse.



Short Finder

Short finders are available to locate shorts to ground. The short finder creates a pulsing magnetic field in the shorted circuit and shows you the location of the short through body trim or sheet metal. Its use is explained in the following troubleshooting tests.

Troubleshooting Tests

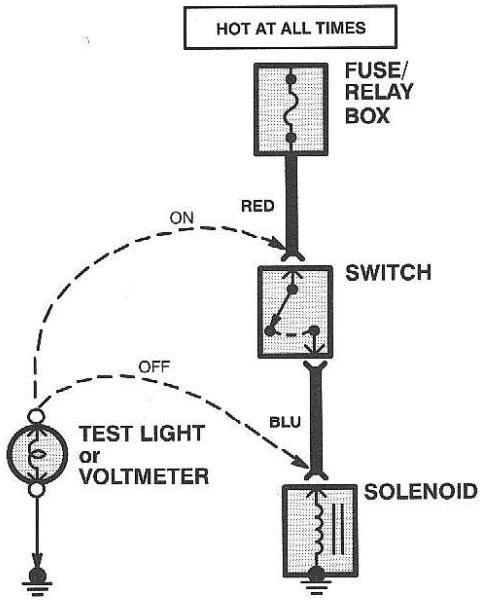
Testing for Voltage

This test measures voltage in a circuit. When testing for voltage at a connector, you do not have to separate the two halves of the connector. Instead, probe the connector from the back. Always check both sides of the connector because dirt and corrosion between its contact surfaces can cause electrical problems.

1. Connect one lead of test light to a known good ground, or if you are using a voltmeter, be sure you connect its negative lead to ground.

2. Connect the other lead of the test light or voltmeter to the point you want to check.

3. If the test light glows, there is voltage present. If you are using a voltmeter, note the voltage reading. It should be within one volt of measured battery voltage. A loss of more than one volt indicates a problem.



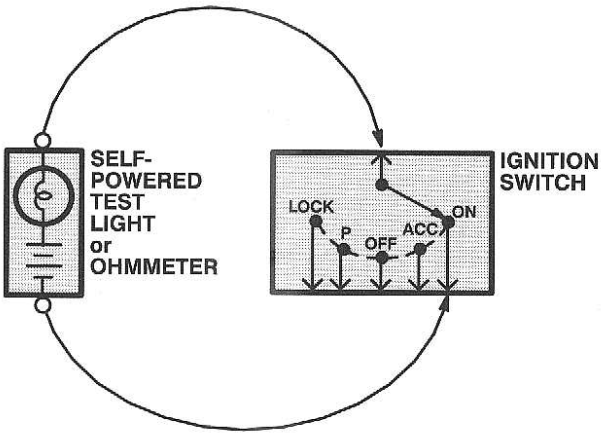
(cont'd)

Troubleshooting Tests (cont'd)

Testing for Continuity

This test checks for continuity within a circuit. When testing for continuity at a connector, you do not have to separate the two halves of the connector. Instead, probe the connector from the back. Always check both sides of the connector because dirt and corrosion between contact surfaces can cause electrical problems.

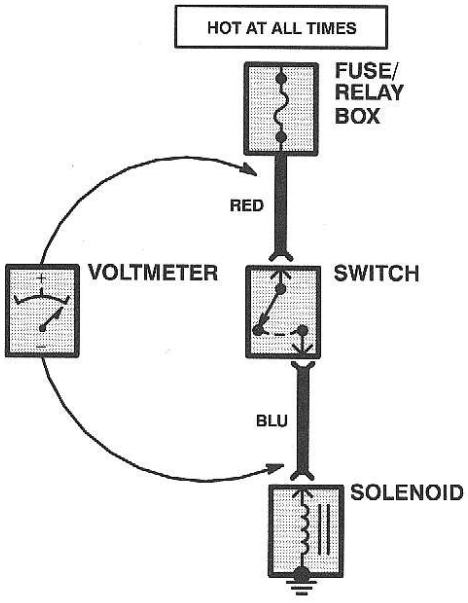
1. Disconnect the negative cable from the battery. If you are using an ohmmeter, hold the leads together and adjust the ohmmeter to read zero ohms.
2. Connect one lead of self-powered test light or ohmmeter to one end of the part of the circuit you wish to test.
3. Connect the other lead to the other end.
4. If the self-powered test light glows, there is continuity. If you're using an ohmmeter, low or no resistance means good continuity.



Testing for Voltage Drop

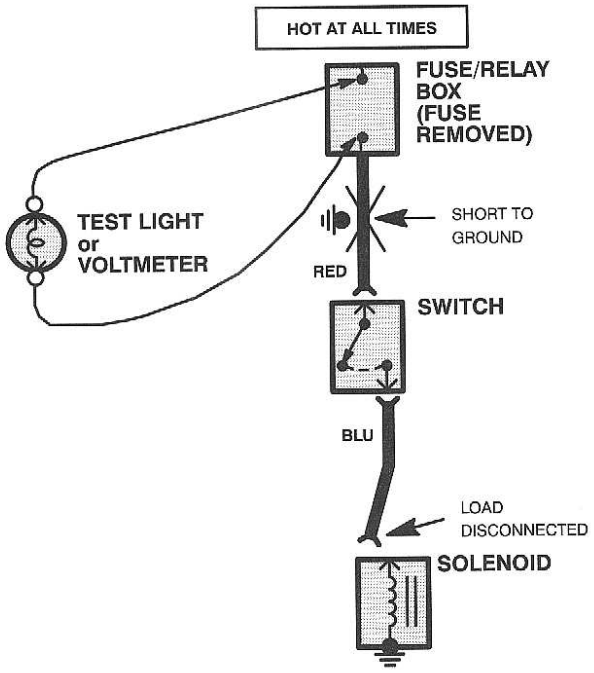
Wires, connectors and switches are designed to conduct current with a minimum loss of voltage. A voltage drop of more than one volt indicates a problem.

1. Connect the positive lead of a voltmeter to the end of the wire (or to the side of the connector or switch) closest to the battery.
2. Connect the negative lead to the other end of the wire (or the other side of the connector or switch).
3. Turn on the components in the circuit.
4. The voltmeter will show the difference in voltage between the two points. A difference, or drop, of more than one volt indicates a problem. Check the circuit for loose or dirty connections.



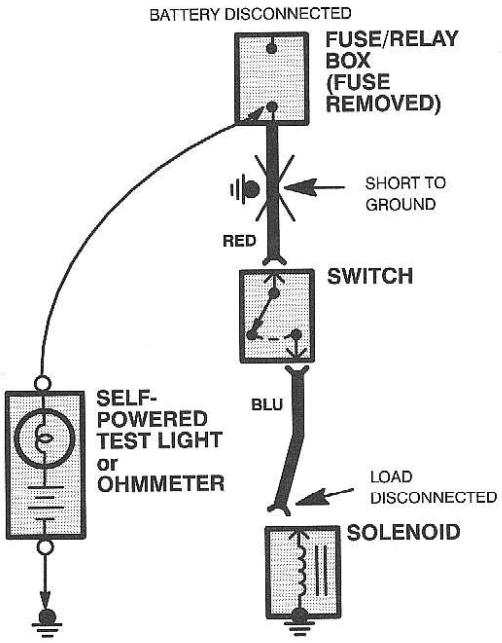
Testing for a Short with a Test Light or Voltmeter

1. Remove the blown fuse and disconnect the load.
2. Connect a test light or voltmeter across the fuse terminals. Make sure that the voltage is being applied to the fuse terminals. You might have to put the ignition switch in RUN. Check the schematic to see.
3. Beginning near the fuse/relay box, wiggle the harness. Continue this at convenient points about six inches apart while watching the test light or voltmeter.
4. When the test light blinks or the voltmeter needle moves, there is a short to ground in the wiring near that point.



Testing for a Short with a Self-Powered Test Light or Ohmmeter

1. Remove the blown fuse and disconnect the battery and load.
2. Connect one lead of a self-powered test light or ohmmeter to the fuse terminal on the load side.
3. Connect the other lead to a known good ground.
4. Beginning near the fuse/relay box, wiggle the harness. Continue this at convenient points about six inches apart while watching the test light or ohmmeter.
5. If the self-powered test light blinks or the ohmmeter needle moves, there is a short to ground in the wiring near that point.

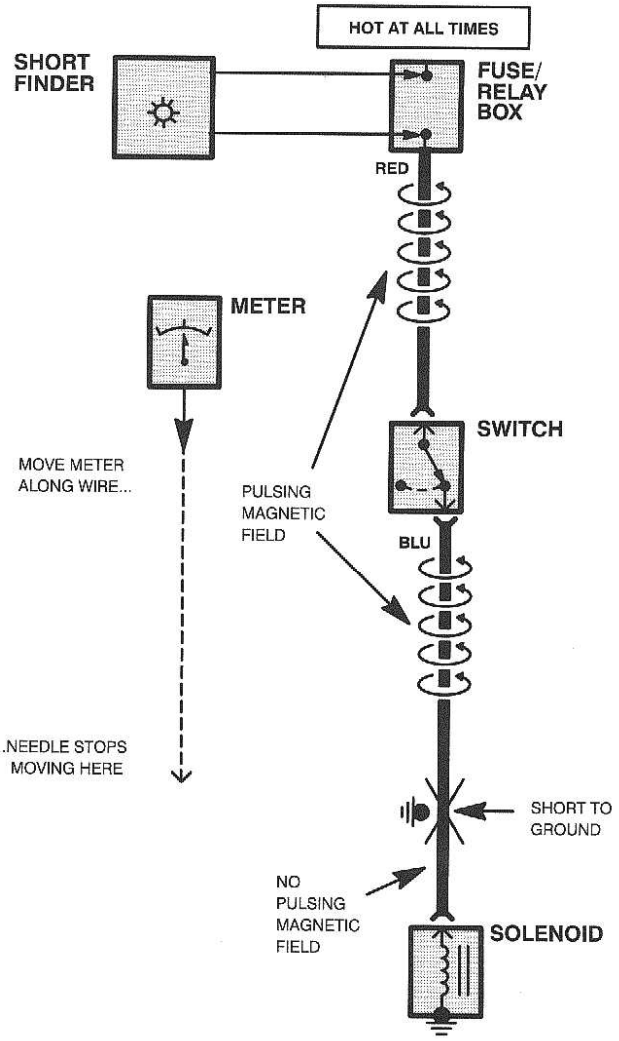


(cont'd)

Troubleshooting Tests (cont'd)

Testing for a Short with a Short Circuit Locator

1. Remove the blown fuse. Leave the battery connected.
2. Connect the short finder across the fuse terminals.
3. Close all switches in series in the circuit you're testing.
4. Turn on the short circuit locator. It sends pulses of current to the short. This creates a pulsing magnetic field around the wiring between the fuse/relay box and the short.
5. Beginning at the fuse/relay box, slowly move the short finder along the circuit wiring. The meter will show current pulses through sheet metal and plastic. As long as the meter is between the fuse and the short, the needle will move with each current pulse. Once you move the meter past the point of the short, the needle will stop moving. Check around this area to locate the cause of the short circuit.



Troubleshooting Precautions

Before Troubleshooting

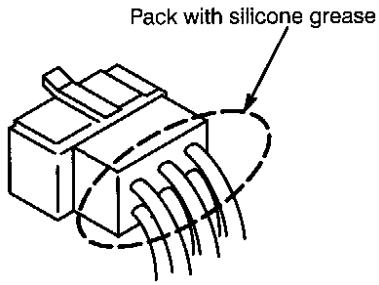
- Check the main fuse and the fuse/relay box.
- Check the battery for damage, state of charge, and clean and tight connections.

CAUTION:

- **Do not quick-charge a battery unless the battery ground cable has been disconnected or you will damage the alternator diodes.**
- **Do not attempt to crank the engine with the ground cable disconnected or you will severely damage the wiring.**

While You're Working

- Make sure connectors are clean and have no loose pins or receptacles.
- Make sure multiple pin connectors are packed with silicone grease.

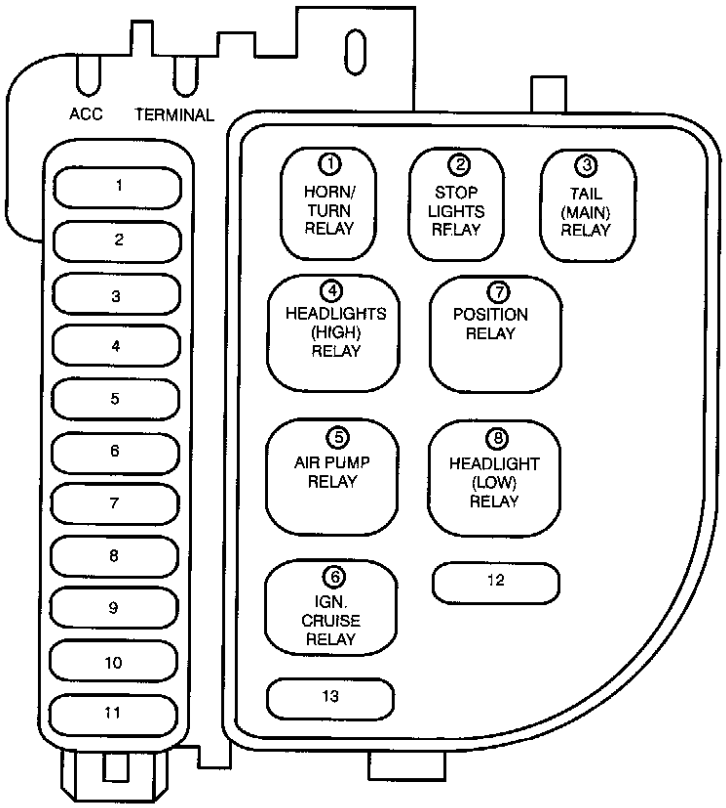


CAUTION:

- **Do not pull on the wires when disconnecting a connector. Pull only on the connector housings.**
- **When connecting a connector, push it until it clicks into place.**
- **Refer to page 1-10 for cautions about troubleshooting circuits that contain solid-state devices.**

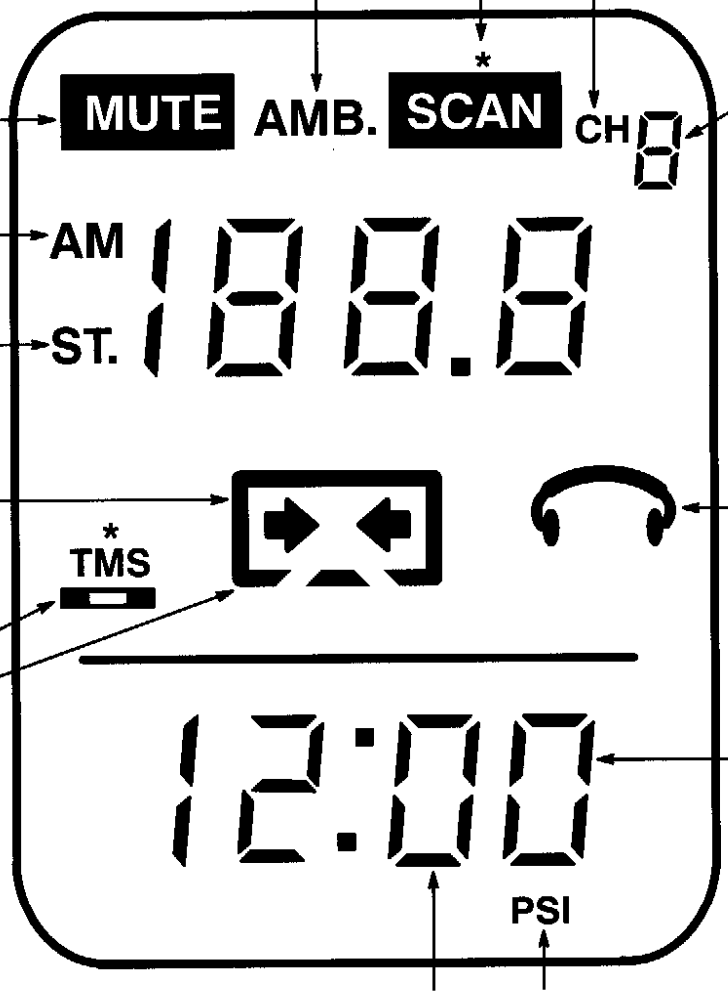
Fuse Information

Fuse/Relay Box



Fuse Number	Fuse Identification	Amps	Circuit or Component Protected
1	Acc Terminal	5	Optional accessories
2	Horn/Turn/ Stop Relay	15	Horns, Horn turn relay coil, Position relay coil, Stop light relay coil, Turn signal cancel control unit, Turn signal flasher relay coil
3	Stop	15	Brake lights
4	Fan	10	Cooling fans
5	Head	15	Headlights, Instrument panel indicators
6	Air Pump	10	Auto level control system
7	Parking	10	Air pump (outlet), Parking lights
8	Tail Meter Position	15	Accessory lights; Instrument panel gauges, Instrument panel indicators, Cornering lights, Headlight relays, License plate light, Position lights, Side marker lights, Taillights, Reverse system control, Handlebar illumination
9	RVS Start	5	Reverse system
10	Acc	10	Air pump relay, CB radio, Stereo/cassette deck, Hazard lights, Instrument panel indicator illumination, Wheel speed sensor
11	Ign. Start Cruise	15	Bank angle sensor, Charging system, Cruise control indicators, Emission controls, Engine control module (ECM), Ignition coils, Ignition/cruise relay coil, Starting system
12	Head Relay	5	Headlights (high & low relay coils)
13	Back Up	5	CB radio, Stereo/cassette deck, Instrument panel indicator illumination, Trunk light

LCD Unit Display



When Radio is in the scan mode, this indicator blinks.

Controlled by the AMB button. This ambience circuit blends frequencies from both channels for a live performance effect.

Blinks on display when M button on radio is pressed.

Controlled by the mute switch button, which automatically lowers radio volume so that external noises may be heard.

Indicates which memory channel has been selected.

Displays AM or FM station; dependent on AM/FM switch.

Displays if FM station is received in stereo.

When cassette player is loaded and radio is turned on, this will indicate tape direction of play, fast forward or rewind direction.

Controlled by headset speaker control knob. Indicates that sounds are present on the headsets and not the speakers.

The Tape Music Sensor indicator is displayed when a cassette is engaged and the search lever has been pushed upward or downward. The cassette then advances or rewinds to the next pause in music.
The corresponding direction indicator blinks to indicate tape direction.

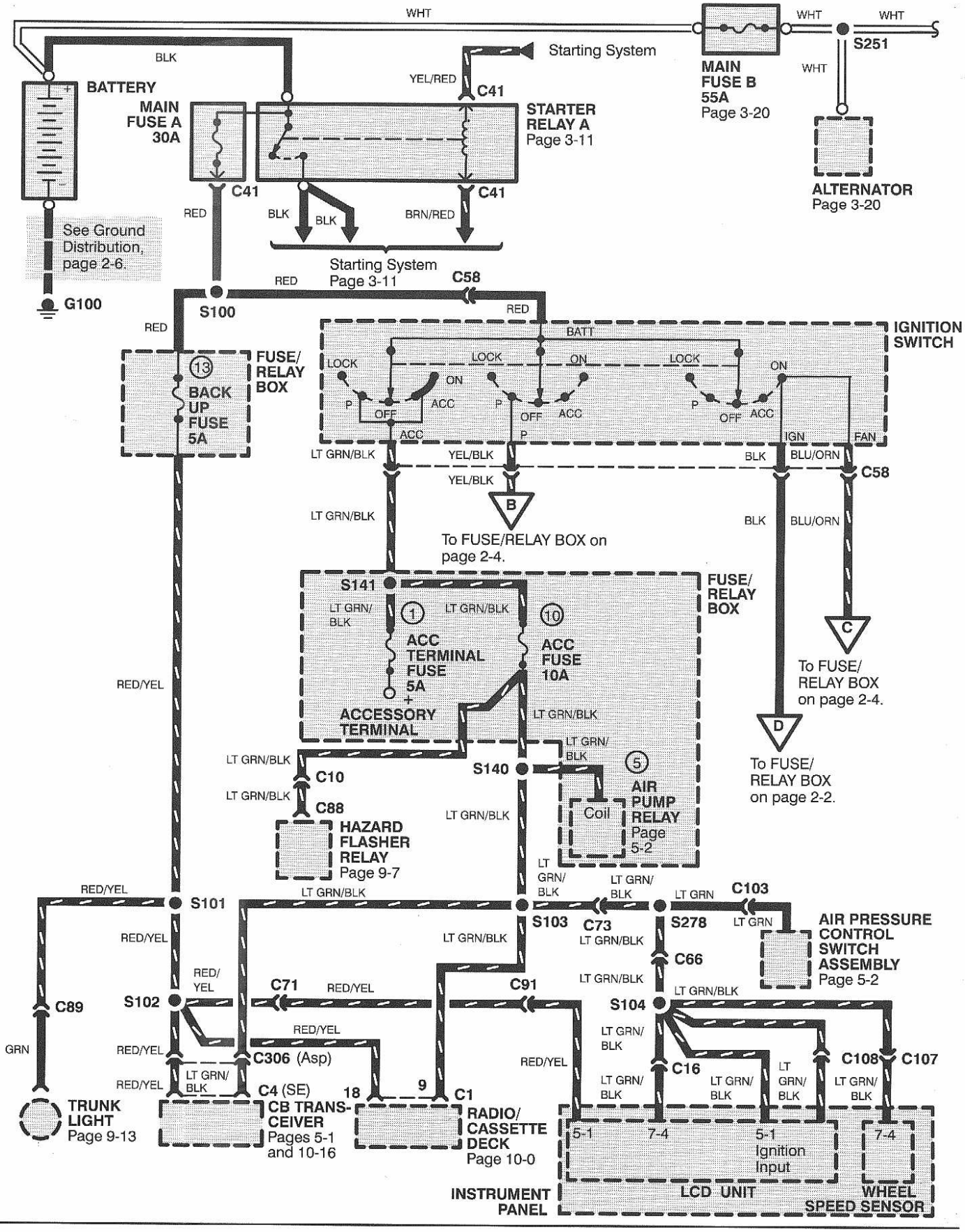
Clock is displayed when ignition switch is in P, ACC, or ON.

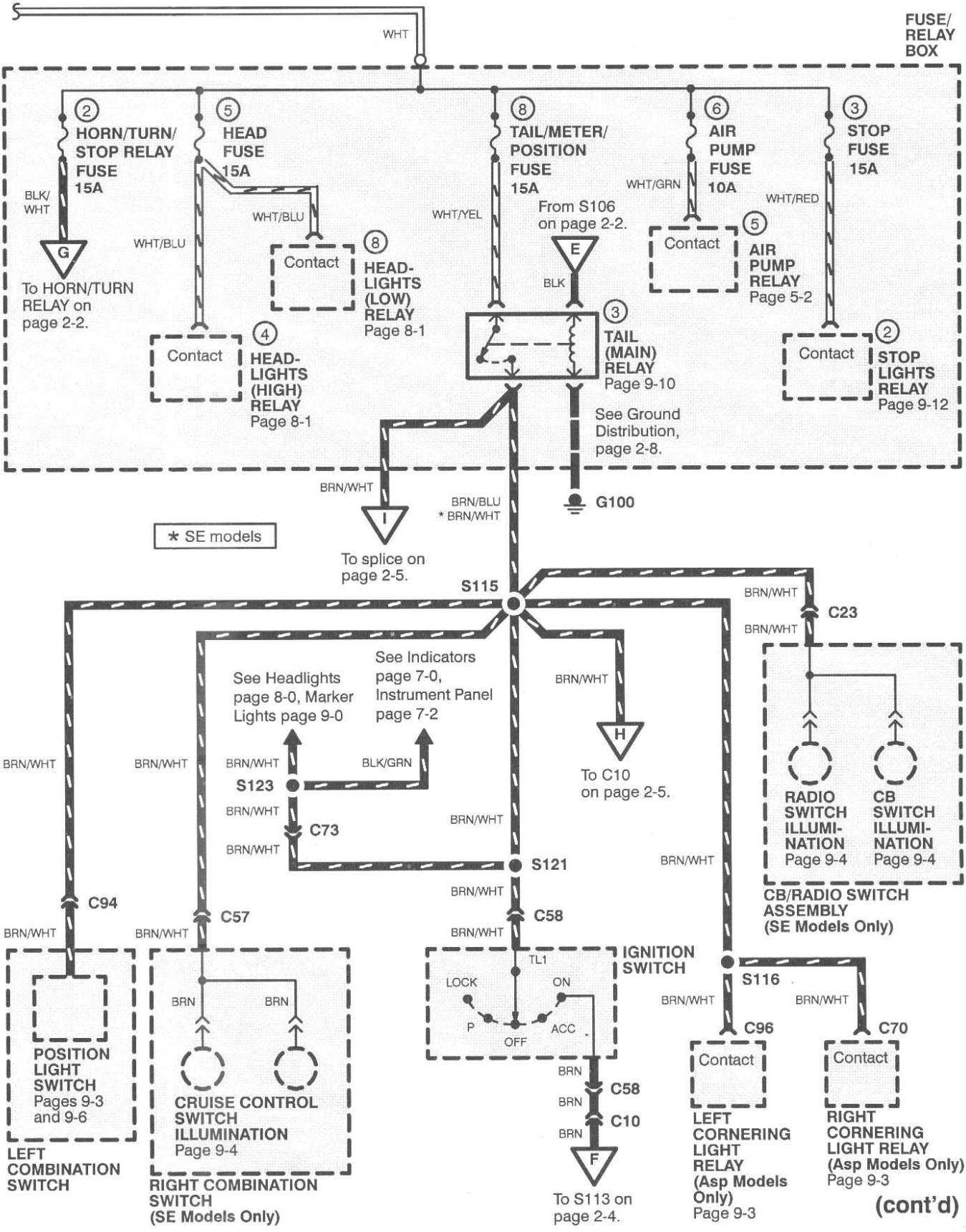
To check air pressure in system, press P. Check button and time will be removed from display and air pressure will be shown in psi for American models, and kg/cm^2 for Canadian models.

* SE Models Only

Power Distribution

Circuit Schematic





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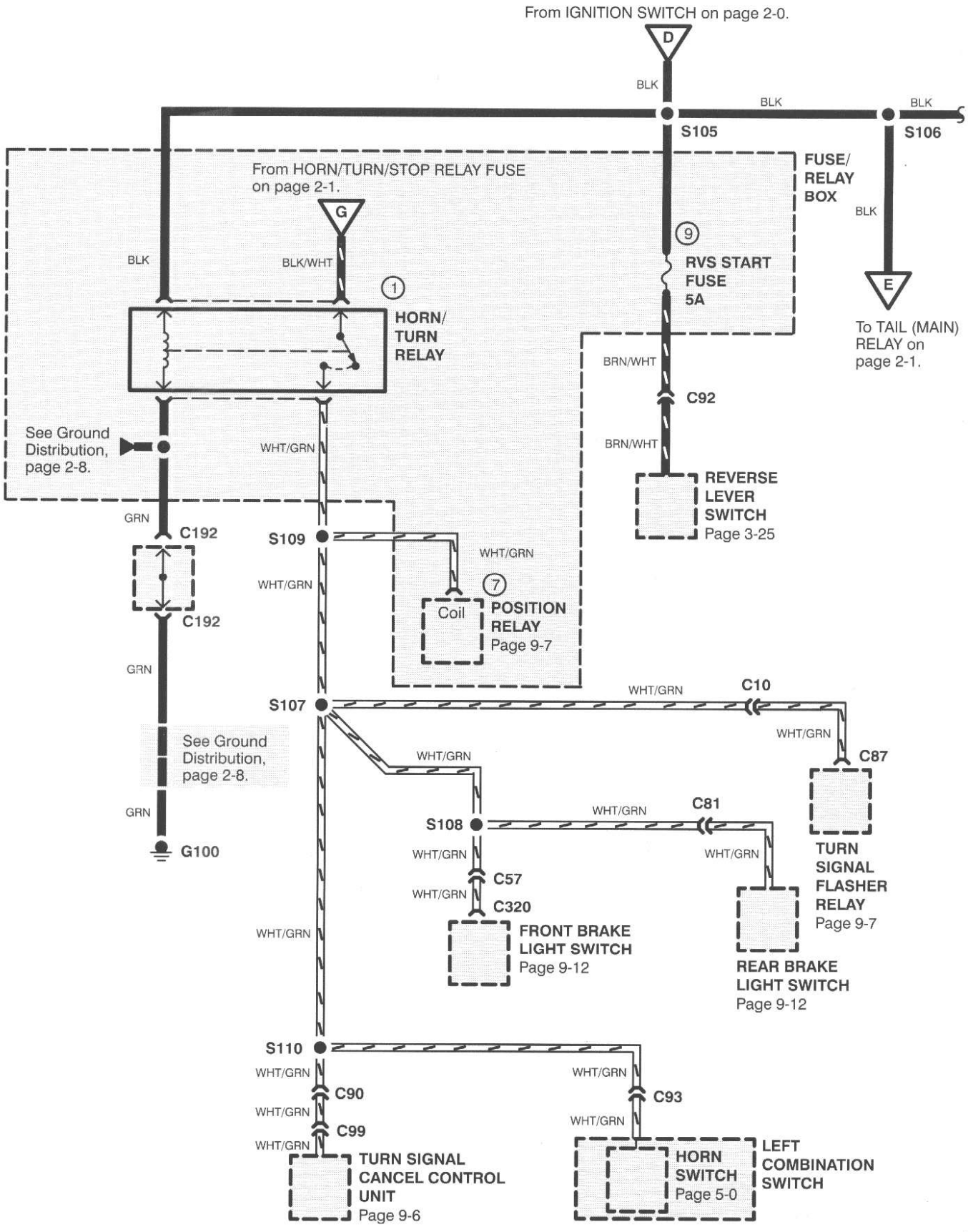
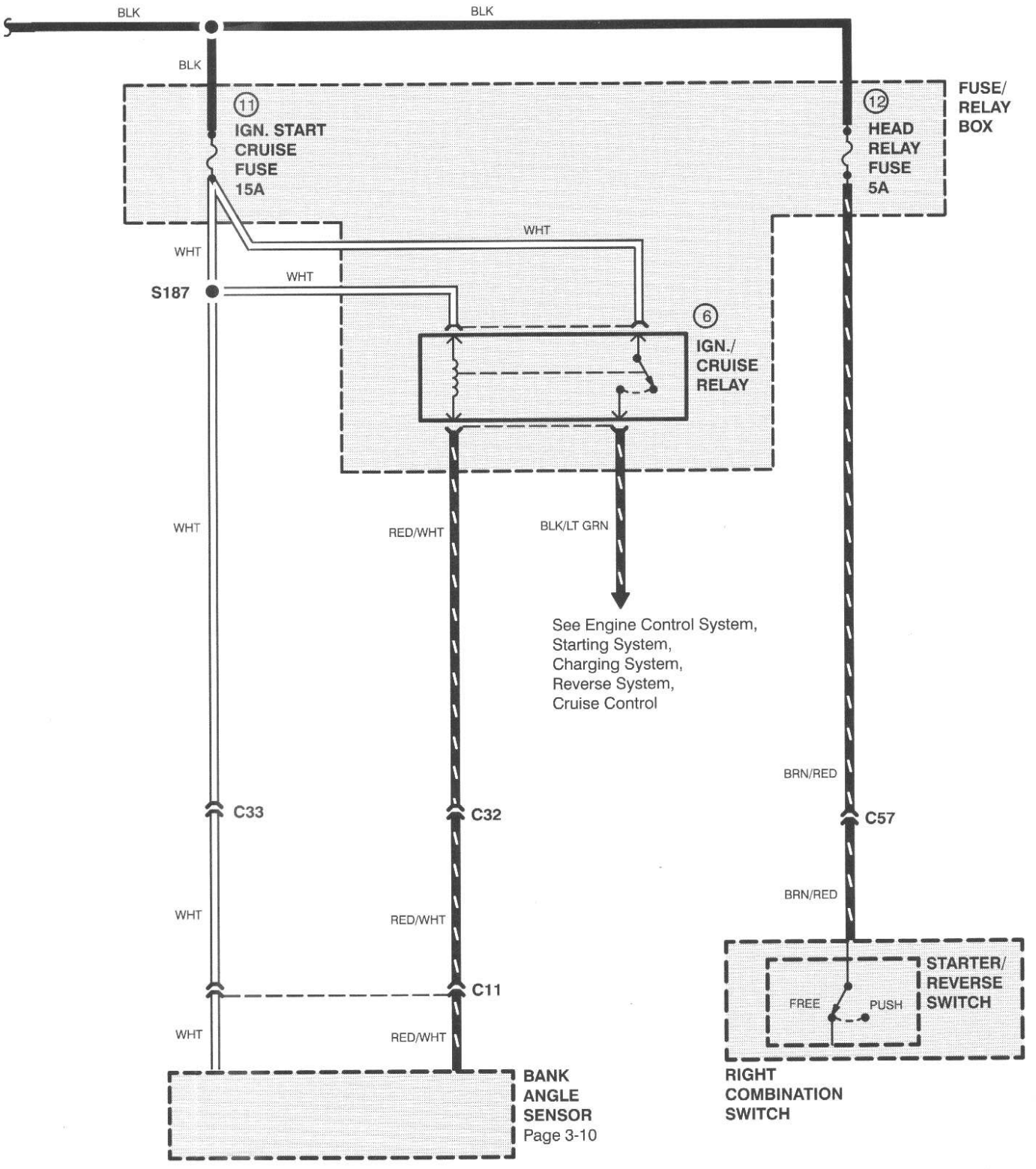
Power Distribution

Circuit Schematic (cont'd)

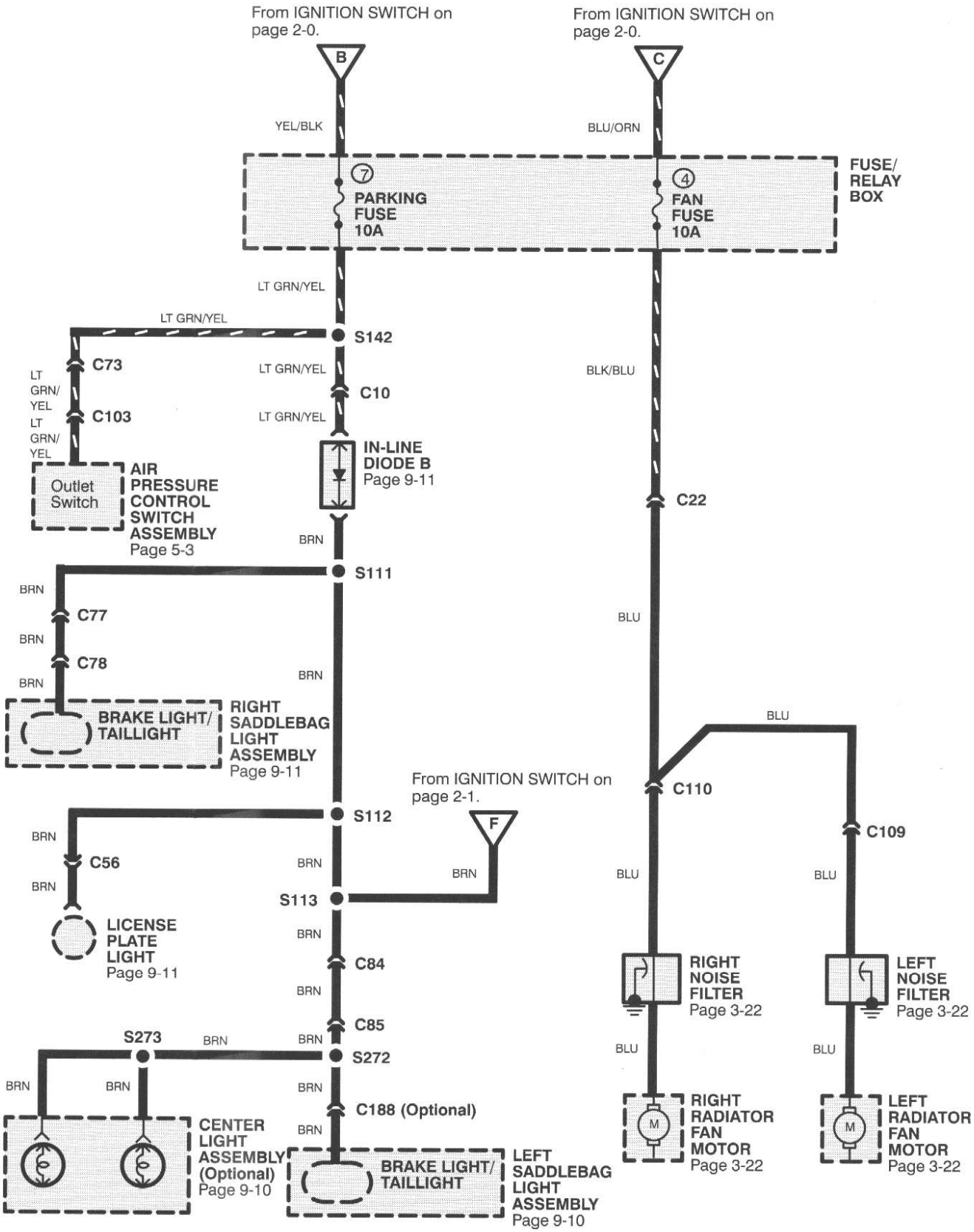


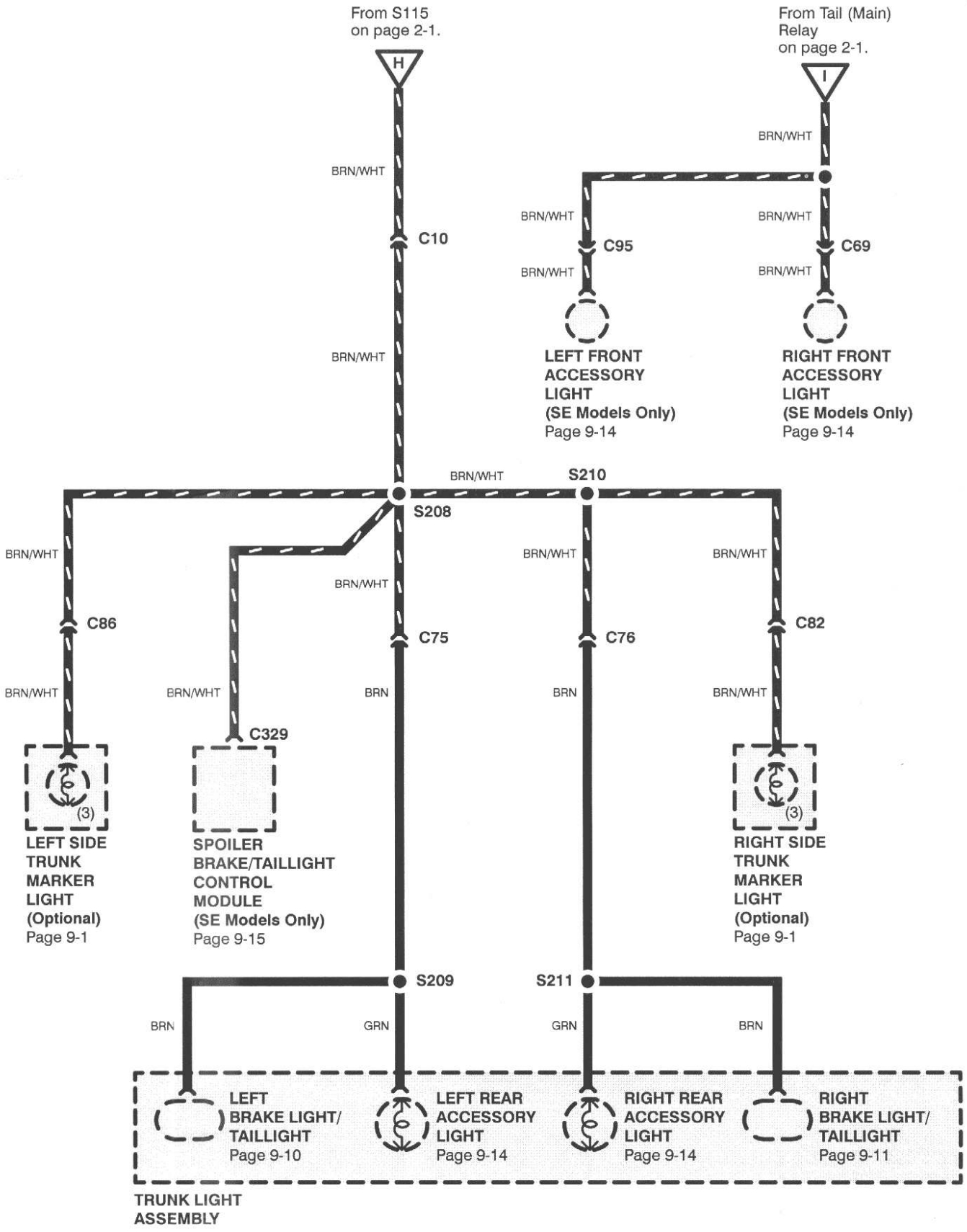

BLK
BLK
BLK
FUSE/
RELAY
BOX
11
IGN. START
CRUISE
FUSE
15A
12
HEAD
RELAY
FUSE
5A
WHT
WHT
WHT
S187
6
IGN./
CRUISE
RELAY
WHT
RED/WHT
BLK/LT GRN
See Engine Control System,
Starting System,
Charging System,
Reverse System,
Cruise Control
BRN/RED
C33
C32
C57
BRN/RED
WHT
RED/WHT
C11
STARTER/
REVERSE
SWITCH
FREE
PUSH
WHT
RED/WHT
BANK
ANGLE
SENSOR
Page 3-10
RIGHT
COMBINATION
SWITCH

(cont'd)

Power Distribution

Circuit Schematic (cont'd)





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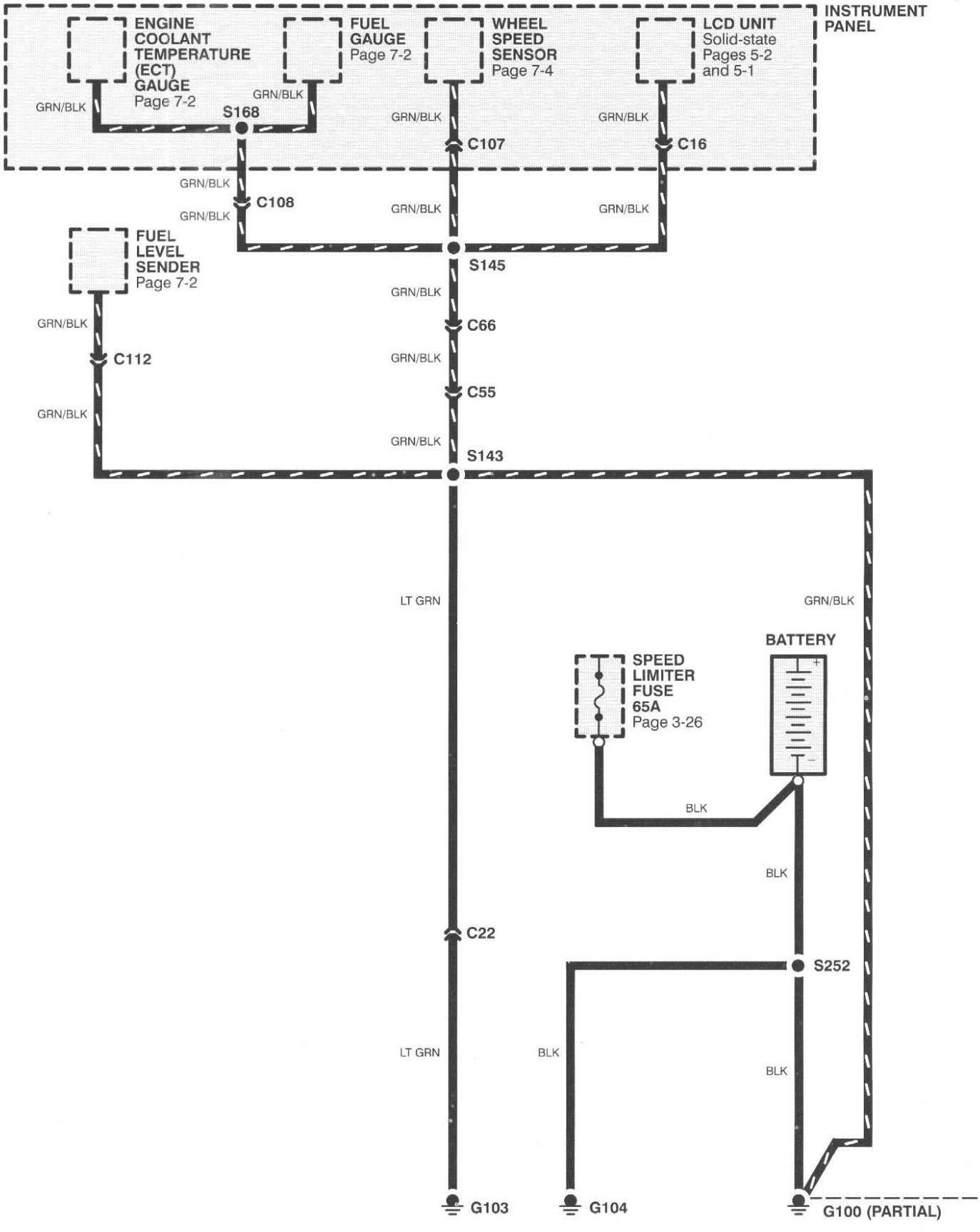
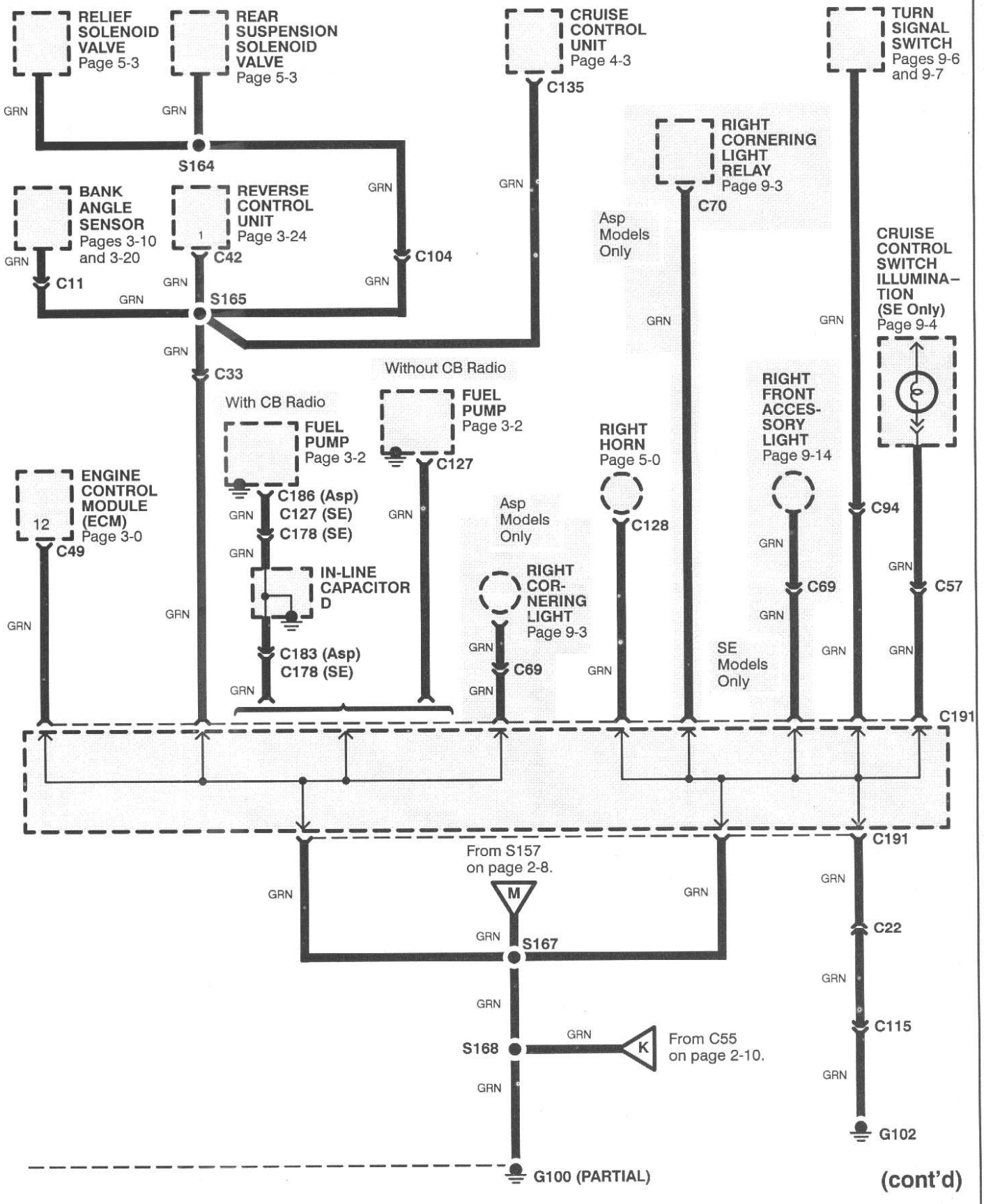
Ground Distribution: G100, G102, G103, and G104

Circuit Schematic





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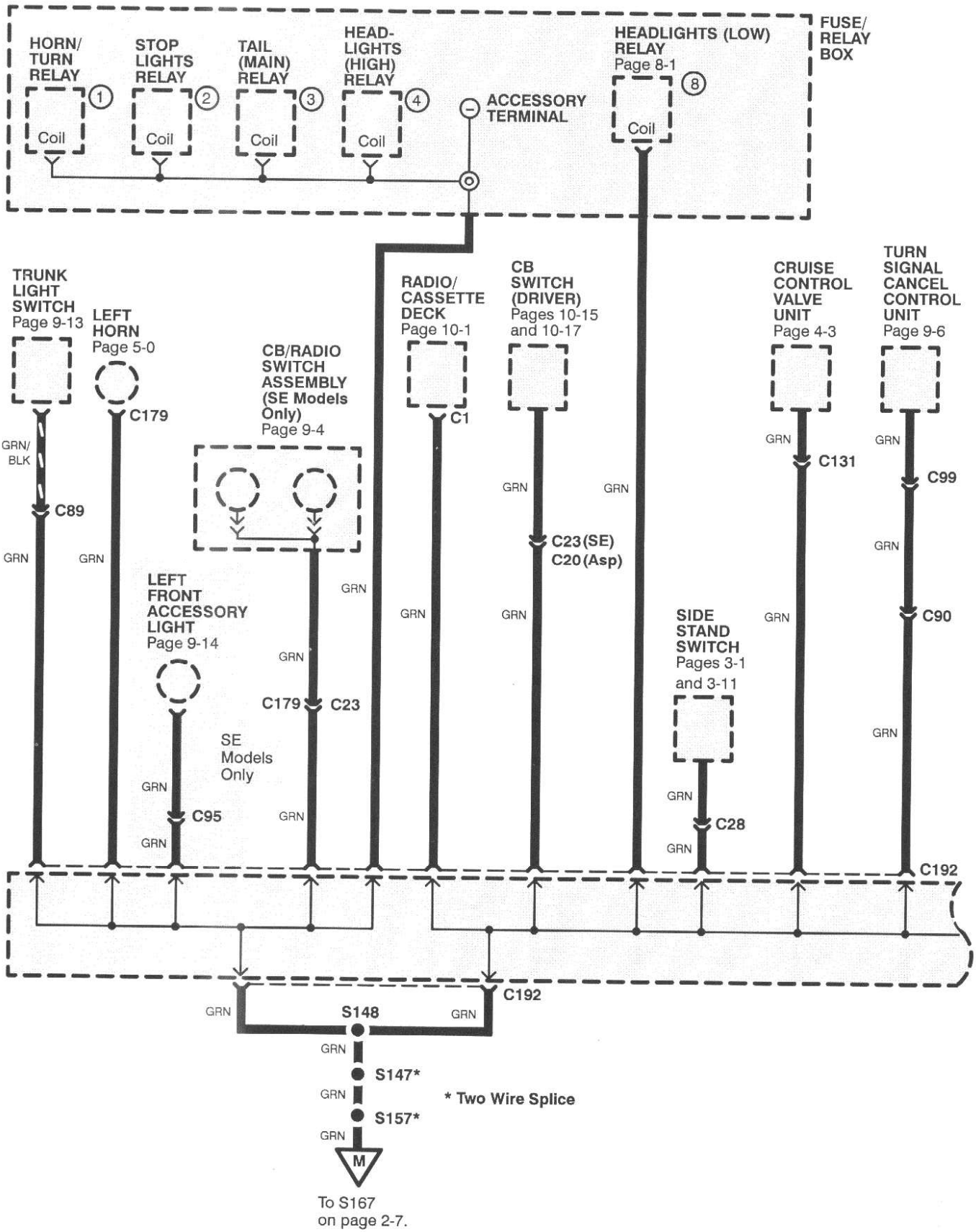
Ground Distribution: G100, G102, G103, and G104

Circuit Schematic (cont'd)



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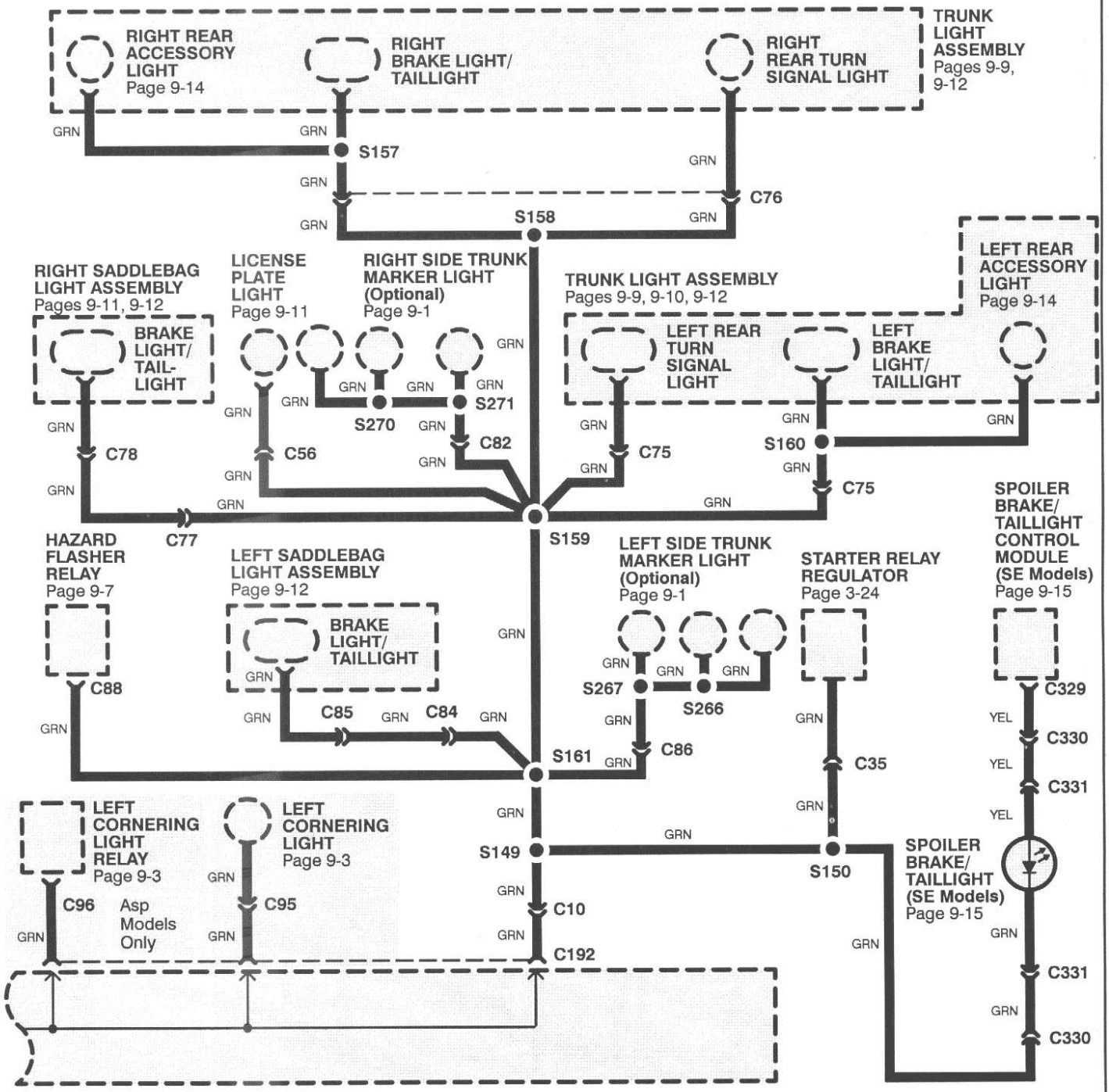

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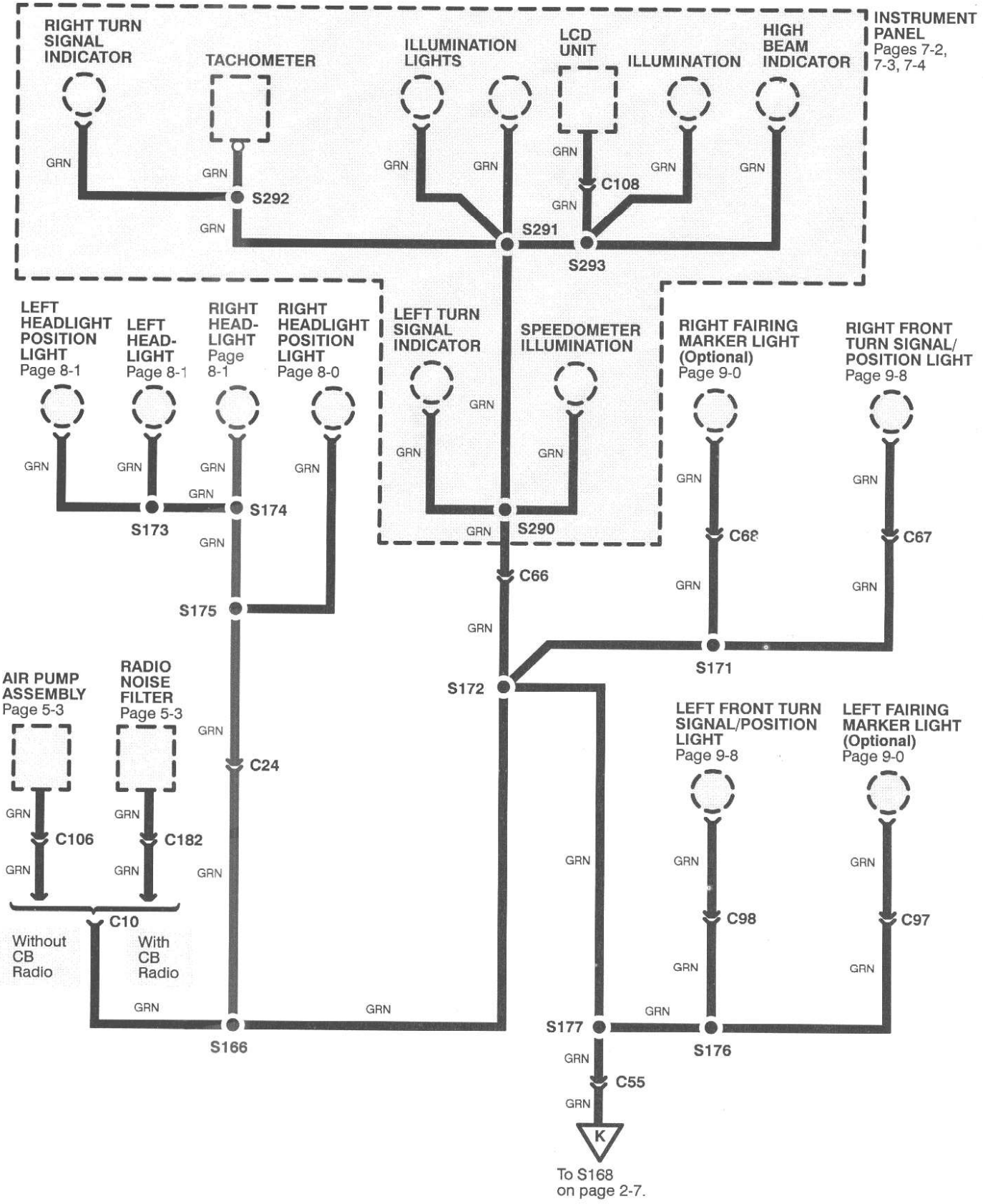
Ground Distribution: G100, G102, G103, and G104

Circuit Schematic (cont'd)



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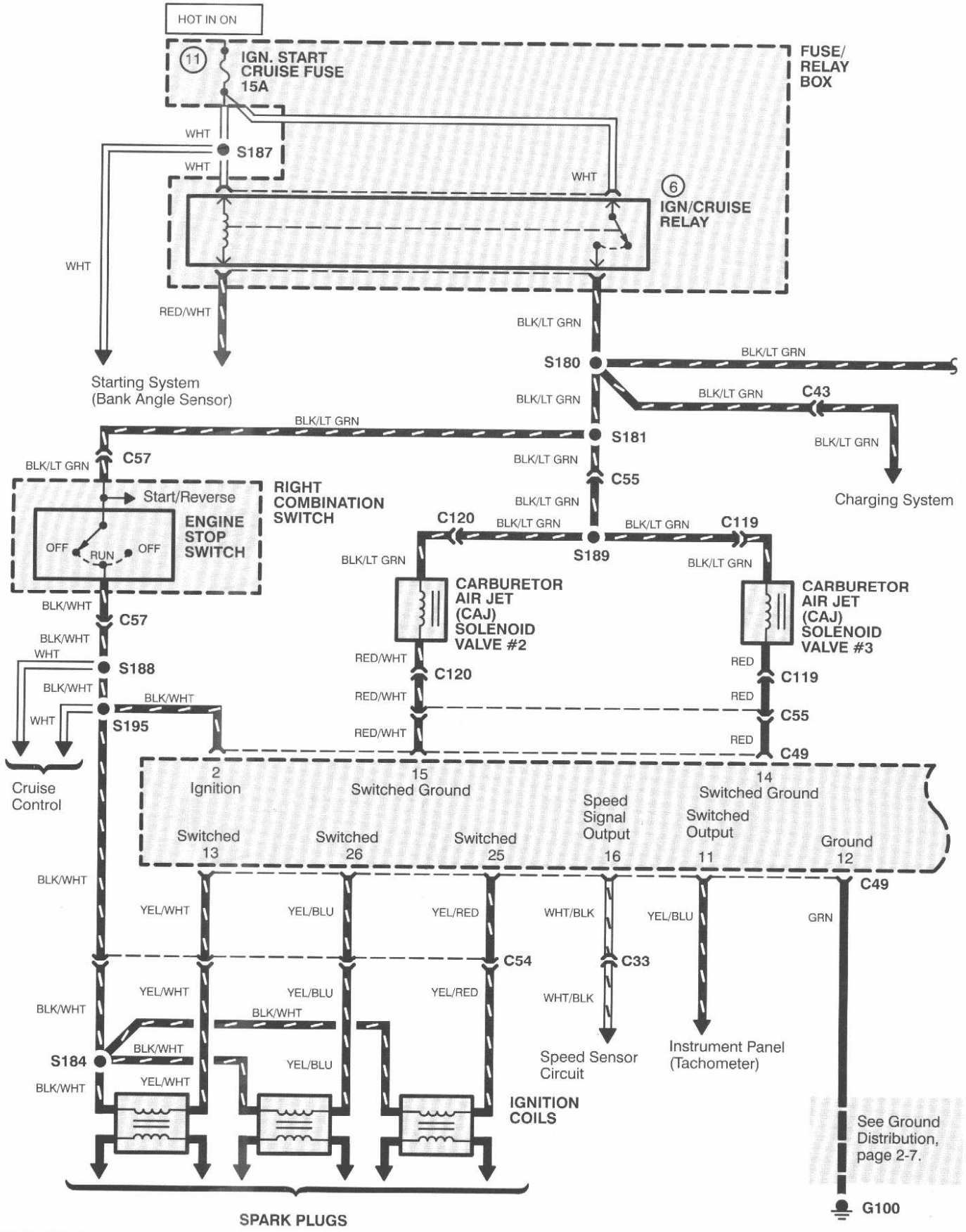
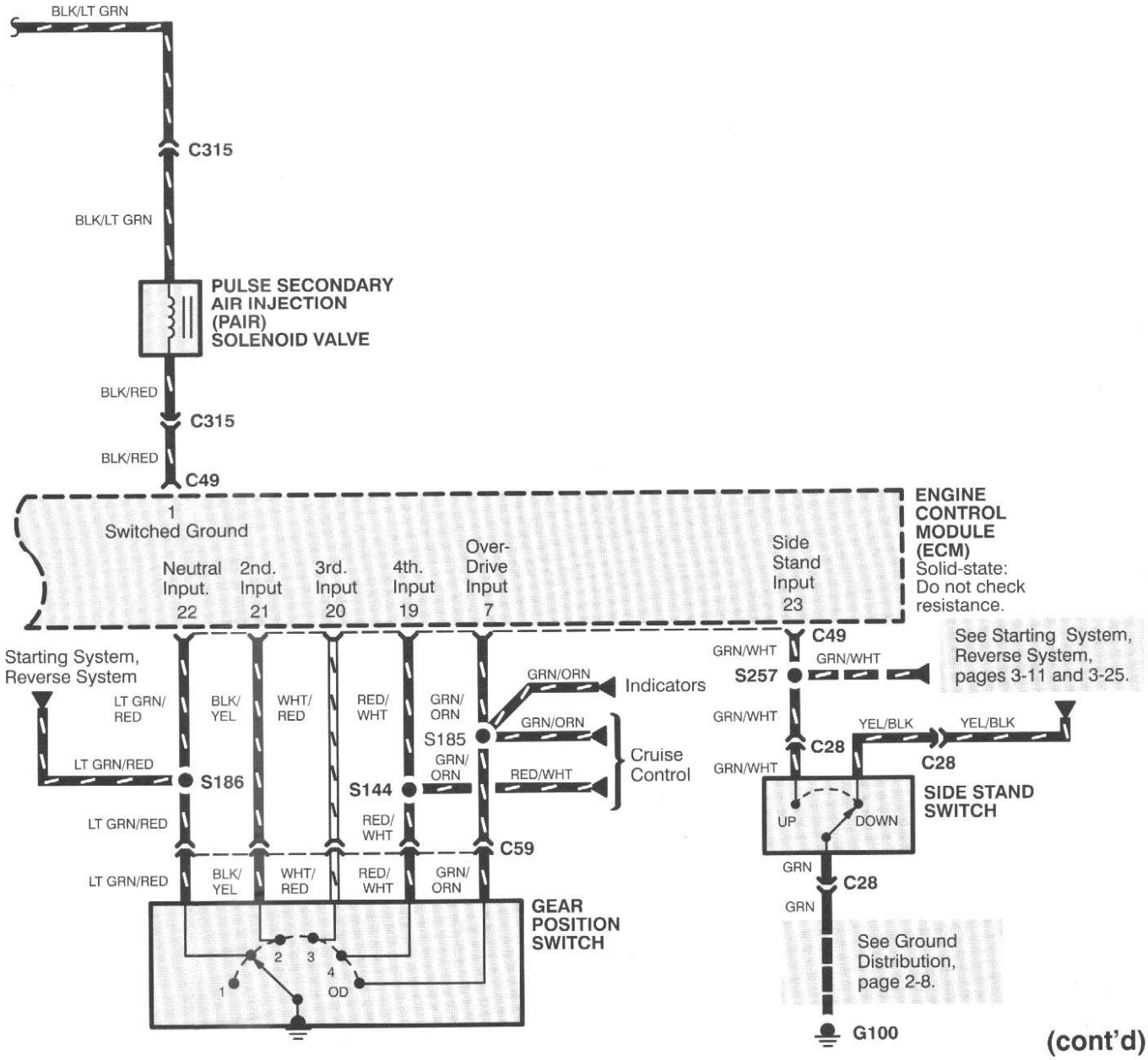
Engine Control System

Circuit Schematic

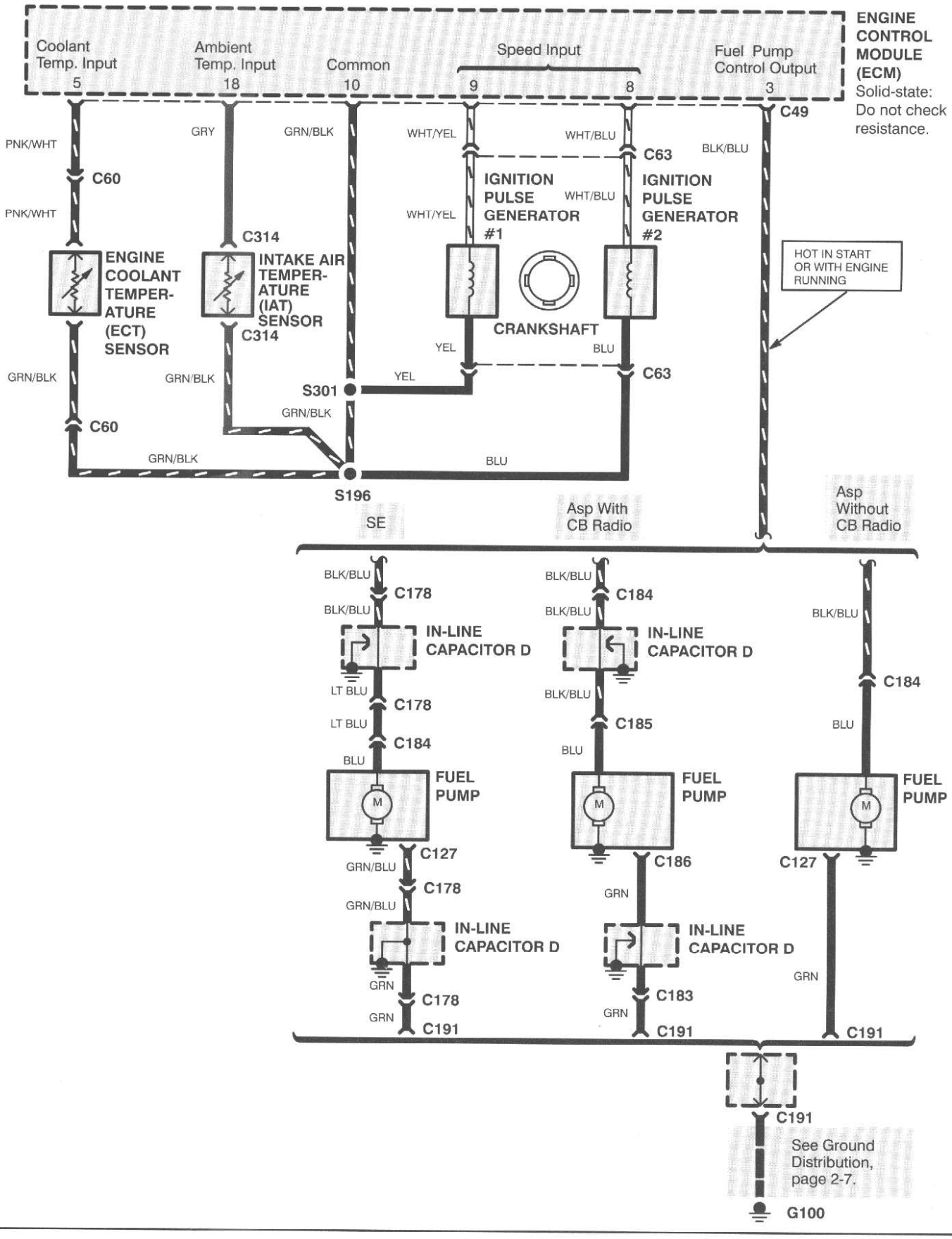



BLK/LT GRN
C315
BLK/LT GRN
PULSE SECONDARY AIR INJECTION (PAIR) SOLENOID VALVE
BLK/RED
C315
BLK/RED
C49
1
Switched Ground
Neutral Input. 22
2nd. Input 21
3rd. Input 20
4th. Input 19
Over-Drive Input 7
Side Stand Input 23
ENGINE CONTROL MODULE (ECM)
Solid-state: Do not check resistance.
C49
GRN/WHT
GRN/WHT
S257
See Starting System, Reverse System, pages 3-11 and 3-25.
Starting System, Reverse System
LT GRN/RED
BLK/YEL
WHT/RED
RED/WHT
GRN/ORN
GRN/ORN
Indicators
GRN/ORN
S185
Cruise Control
RED/WHT
LT GRN/RED
S186
GRN/ORN
S144
GRN/WHT
C28
YEL/BLK
YEL/BLK
C28
GRN/WHT
SIDE STAND SWITCH
UP
DOWN
LT GRN/RED
RED/WHT
C59
LT GRN/RED
BLK/YEL
WHT/RED
RED/WHT
GRN/ORN
GRN
C28
GRN
GEAR POSITION SWITCH
1
2
3
4
OD
See Ground Distribution, page 2-8.
G100

(cont'd)

Engine Control System

Circuit Schematic (cont'd)



How the Circuit Works

Engine performance is controlled by the engine control module (ECM). The ECM receives battery voltage when the engine stop switch is in RUN. The ECM monitors coolant temperature, intake air temperature, gear position, and engine speed. It also controls engine operation by operating several solenoid valves, ignition coils, and the fuel pump.

Carburetor Air Jet (CAJ) Solenoid Valves

The CAJ solenoid valves receive battery voltage from the ignition/cruise relay with the ignition ON. They receive a ground control signal from the ECM.

Pulse Secondary Air Injection (PAIR) Solenoid Valve

The PAIR solenoid valve receives battery voltage from the ignition/cruise relay with the ignition ON. It is controlled by a ground control signal from the ECM.

Ignition Coils

The three ignition coils receive battery voltage with the ignition ON and the engine stop switch in RUN. Each coil is fired individually when the ECM grounds the corresponding coil control line. The ECM can vary ignition timing based on other sensor information.

Gear Position Switch

The gear position switch supplies five input circuits to the ECM for the positions N, 2, 3, 4, and OD. The respective circuits are ground when in the associated gear and open otherwise.

Side Stand Switch

The side stand switch sends a ground signal to the ECM with the side stand switch in UP and is open in DOWN.

Intake Air Temperature (IAT) Sensor

The intake air temperature (IAT) sensor is a resistor that increases resistance with a decrease in temperature and decreases resistance with an increase in temperature. The IAT sensor sends this resistance signal to the ECM through the GRN/BLK sensor common and the GRY ambient air temperature input circuit.

Ignition Pulse Generators

The ignition pulse generators are coils that generate a magnetic pulse when the crankshaft magnet passes by the pulse generator pickups. This pulsing signal conveys crankshaft position and engine RPM information to the ECM. One end of these generators is tied to the GRN/BLK sensor common. The ignition pulse generator signals are sent to the ECM through the WHT/YEL and WHT/BLU circuits.

Fuel Pump

The fuel pump is a DC motor that receives ground through the GRN circuit. It receives a voltage control signal from the ECM.

Engine Coolant Temperature (ECT) Sensor

The engine coolant temperature (ECT) sensor is a resistor that increases resistance with a decrease in temperature and decreases resistance with an increase in temperature. The ECT sensor sends this resistance signal to the ECM through the GRN/BLK sensor common and the PNK/WHT coolant temperature input circuit.

Troubleshooting

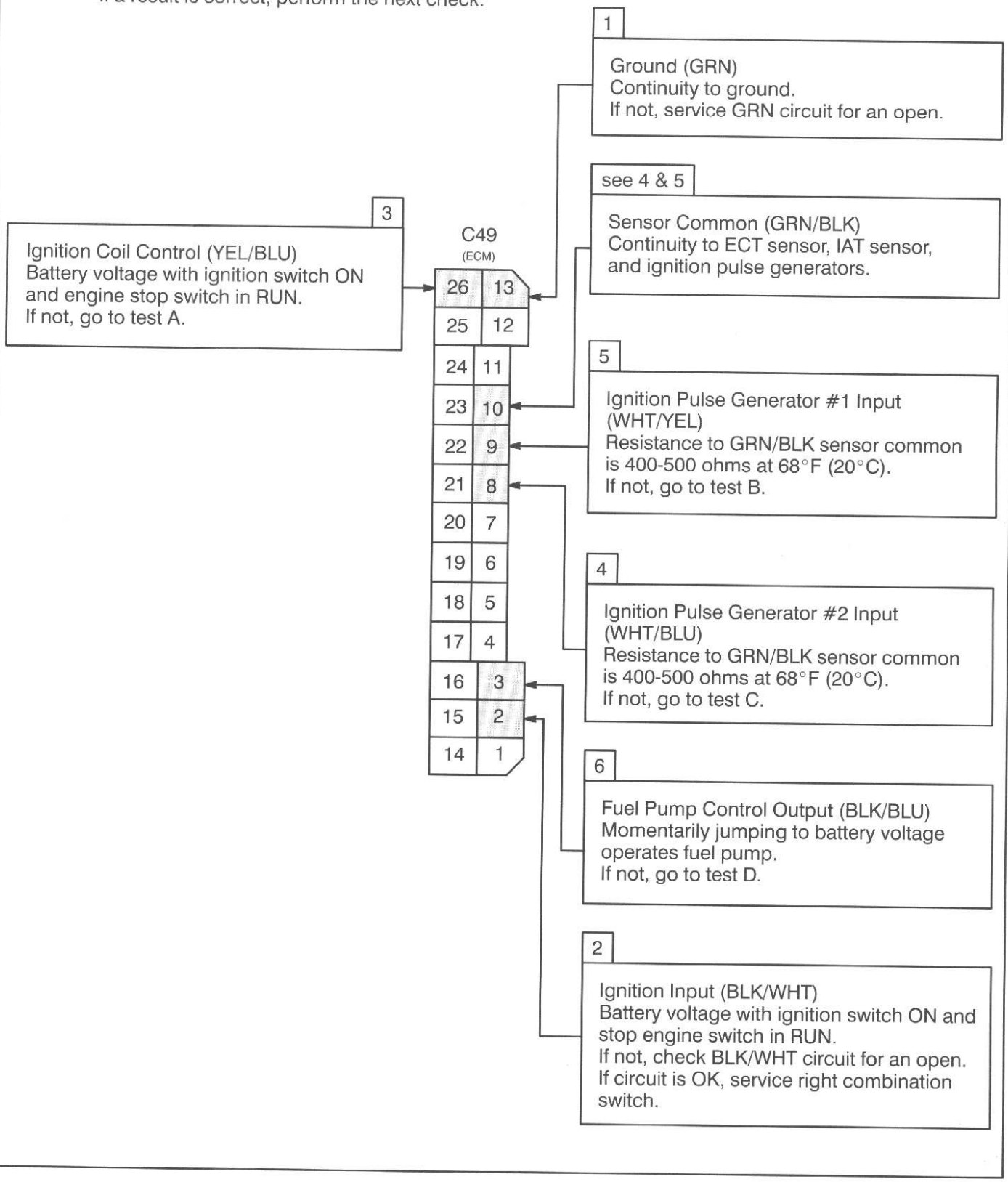
SYMPTOM	DIAGNOSIS
• Engine cranks but does not start. • Engine runs poorly.	• Do Isolation Procedure 1. • Do Isolation Procedure 2.

(cont'd)

Troubleshooting (cont'd)

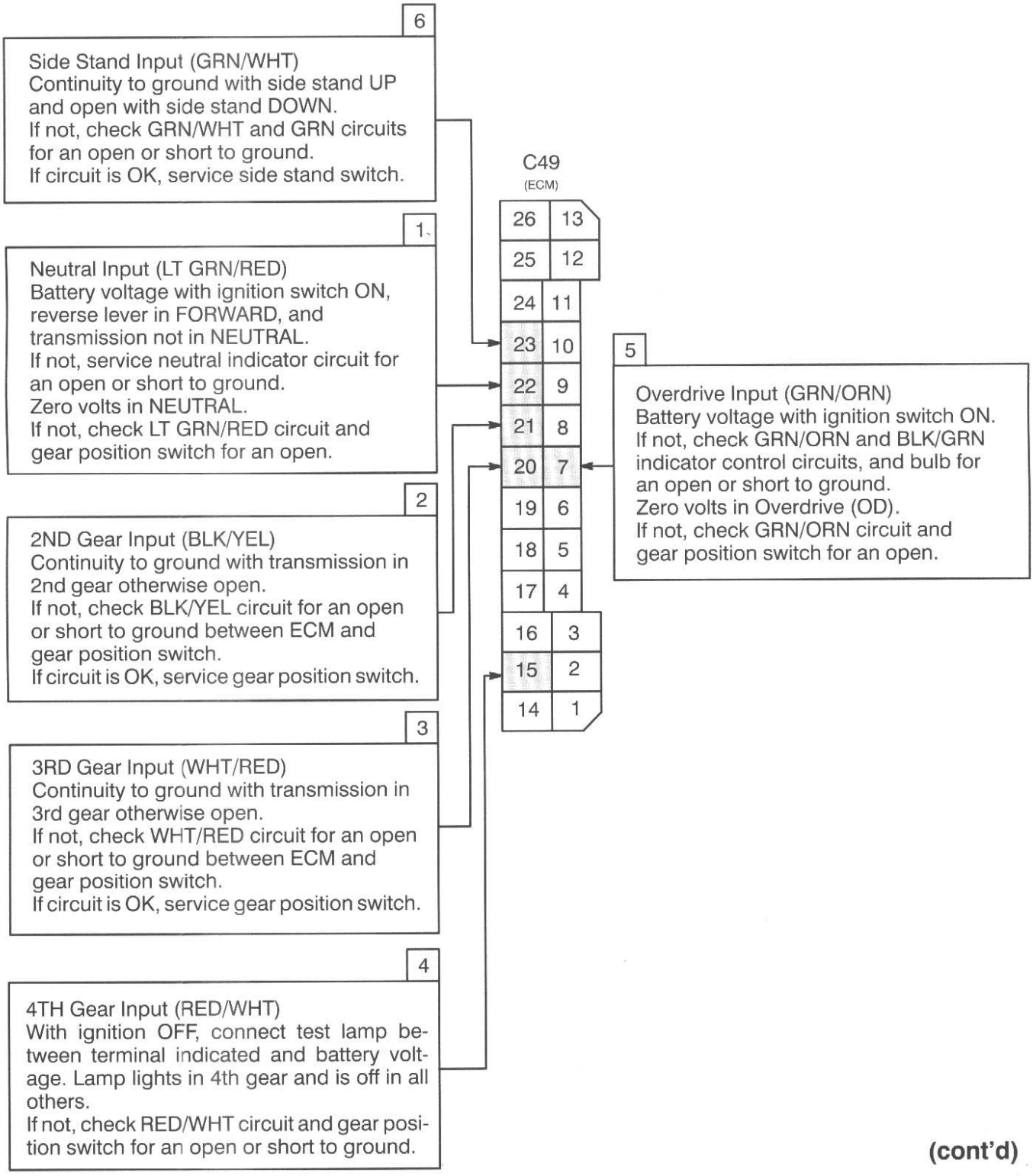
ISOLATION PROCEDURE 1

Note: Perform all checks in order.
If a result is incorrect, go to the test referenced.
If a result is correct, perform the next check.


1
Ground (GRN)
Continuity to ground.
If not, service GRN circuit for an open.
see 4 & 5
Sensor Common (GRN/BLK)
Continuity to ECT sensor, IAT sensor, and ignition pulse generators.
3
Ignition Coil Control (YEL/BLU)
Battery voltage with ignition switch ON and engine stop switch in RUN.
If not, go to test A.
C49
(ECM)
26 13
25 12
24 11
23 10
22 9
21 8
20 7
19 6
18 5
17 4
16 3
15 2
14 1
5
Ignition Pulse Generator #1 Input (WHT/YEL)
Resistance to GRN/BLK sensor common is 400-500 ohms at 68°F (20°C).
If not, go to test B.
4
Ignition Pulse Generator #2 Input (WHT/BLU)
Resistance to GRN/BLK sensor common is 400-500 ohms at 68°F (20°C).
If not, go to test C.
6
Fuel Pump Control Output (BLK/BLU)
Momentarily jumping to battery voltage operates fuel pump.
If not, go to test D.
2
Ignition Input (BLK/WHT)
Battery voltage with ignition switch ON and stop engine switch in RUN.
If not, check BLK/WHT circuit for an open.
If circuit is OK, service right combination switch.

ISOLATION PROCEDURE 2

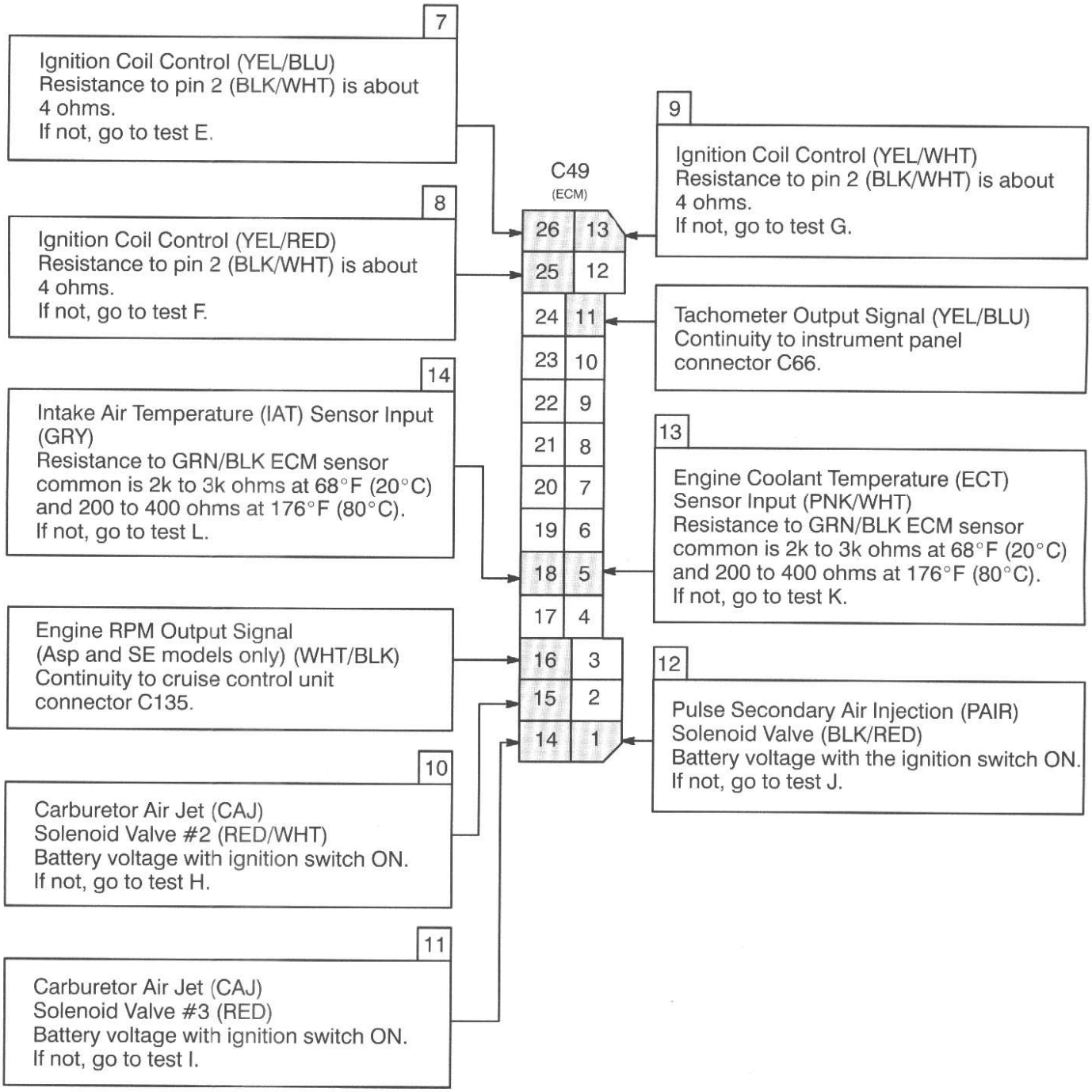
Note: Perform all checks in order.
If a result is incorrect, go to the test referenced.
If a result is correct, perform the next check.
If a box is not numbered, do not check.


6
Side Stand Input (GRN/WHT)
Continuity to ground with side stand UP and open with side stand DOWN.
If not, check GRN/WHT and GRN circuits for an open or short to ground.
If circuit is OK, service side stand switch.
1
Neutral Input (LT GRN/RED)
Battery voltage with ignition switch ON, reverse lever in FORWARD, and transmission not in NEUTRAL.
If not, service neutral indicator circuit for an open or short to ground.
Zero volts in NEUTRAL.
If not, check LT GRN/RED circuit and gear position switch for an open.
2
2ND Gear Input (BLK/YEL)
Continuity to ground with transmission in 2nd gear otherwise open.
If not, check BLK/YEL circuit for an open or short to ground between ECM and gear position switch.
If circuit is OK, service gear position switch.
3
3RD Gear Input (WHT/RED)
Continuity to ground with transmission in 3rd gear otherwise open.
If not, check WHT/RED circuit for an open or short to ground between ECM and gear position switch.
If circuit is OK, service gear position switch.
4
4TH Gear Input (RED/WHT)
With ignition OFF, connect test lamp between terminal indicated and battery voltage. Lamp lights in 4th gear and is off in all others.
If not, check RED/WHT circuit and gear position switch for an open or short to ground.
C49
(ECM)
26 13
25 12
24 11
23 10
22 9
21 8
20 7
19 6
18 5
17 4
16 3
15 2
14 1
5
Overdrive Input (GRN/ORN)
Battery voltage with ignition switch ON.
If not, check GRN/ORN and BLK/GRN indicator control circuits, and bulb for an open or short to ground.
Zero volts in Overdrive (OD).
If not, check GRN/ORN circuit and gear position switch for an open.

(cont'd)

Troubleshooting (cont'd)

ISOLATION PROCEDURE 2 (cont'd)


7
Ignition Coil Control (YEL/BLU)
Resistance to pin 2 (BLK/WHT) is about 4 ohms.
If not, go to test E.
8
Ignition Coil Control (YEL/RED)
Resistance to pin 2 (BLK/WHT) is about 4 ohms.
If not, go to test F.
14
Intake Air Temperature (IAT) Sensor Input (GRY)
Resistance to GRN/BLK ECM sensor common is 2k to 3k ohms at 68°F (20°C) and 200 to 400 ohms at 176°F (80°C).
If not, go to test L.
Engine RPM Output Signal (Asp and SE models only) (WHT/BLK)
Continuity to cruise control unit connector C135.
10
Carburetor Air Jet (CAJ) Solenoid Valve #2 (RED/WHT)
Battery voltage with ignition switch ON.
If not, go to test H.
11
Carburetor Air Jet (CAJ) Solenoid Valve #3 (RED)
Battery voltage with ignition switch ON.
If not, go to test I.
C49
(ECM)
26 13
25 12
24 11
23 10
22 9
21 8
20 7
19 6
18 5
17 4
16 3
15 2
14 1
9
Ignition Coil Control (YEL/WHT)
Resistance to pin 2 (BLK/WHT) is about 4 ohms.
If not, go to test G.
Tachometer Output Signal (YEL/BLU)
Continuity to instrument panel connector C66.
13
Engine Coolant Temperature (ECT) Sensor Input (PNK/WHT)
Resistance to GRN/BLK ECM sensor common is 2k to 3k ohms at 68°F (20°C) and 200 to 400 ohms at 176°F (80°C).
If not, go to test K.
12
Pulse Secondary Air Injection (PAIR) Solenoid Valve (BLK/RED)
Battery voltage with the ignition switch ON.
If not, go to test J.

Test A: Ignition Coil Input Test

Disconnect C54. Turn the ignition switch ON and place engine stop switch in RUN.
Check that there is battery voltage at BLK/WHT (ECM side of C54) circuit.
If yes, go to test G.
If no, service BLK/WHT circuit for an open.

Test B: Ignition Pulse Generator #1 Input Test

1. Disconnect C63 and connect ohmmeter across WHT/YEL and YEL circuits at generator side of connector. Resistance should be about 400-500 ohms.
   If yes, check YEL, GRN/BLK, and WHT/YEL circuits between ECM and ignition pulse generators for an open.
   If no, replace ignition pulse generator.

Test C: Ignition Pulse Generator #2 Input Test

1. Disconnect C63 and connect ohmmeter across WHT/BLU and BLU circuits at generator side of connector. Resistance should be about 400-500 ohms.
   If yes, check BLU, GRN/BLK, and WHT/BLU circuits between ECM and ignition pulse generators for an open.
   If no, replace ignition pulse generator.

Test D: Fuel Pump Control Test

⚠ WARNING **Gasoline is flammable and is explosive under certain conditions. Do not smoke or allow flames or sparks in your working area. Immediately wipe up any spills.**

1. Disconnect C184 (except Asp model) or C185 (Asp model). Momentarily jumper BLU circuit (fuel pump side) to battery voltage. Fuel pump should run.
   If yes, service BLK/BLU circuit between ECM and C184 or C185 for an open.
   If no, go to step 2.
2. Disconnect C127 (except Asp model) or C186 (Asp model). Check GRN circuit (Asp model) or GRN/BLU circuit (SE model) for continuity for ground.
   If yes, service fuel pump.
   If no, service GRN or GRN/BLU circuit for an open.

Test E: Ignition Coil Input Test

1. Connect ohmmeter across BLK/WHT and YEL/BLU circuits at ignition coil side of C54. Resistance should be about 4 ohms.
   If OK, service YEL/BLU circuit between ECM and C54 for an open.
   If not OK, service ignition coil.

(cont'd)

Troubleshooting (cont'd)

Test F: Ignition Coil Input Test

1. Connect ohmmeter across BLK/WHT and YEL/RED circuits at ignition coil side of C54.
   Resistance should be about 4 ohms.
   If OK, service YEL/RED circuit between ECM and C54 for an open.
   If not OK, service ignition coil.

Test G: Ignition Coil Input Test

1. Connect ohmmeter across BLK/WHT and YEL/WHT circuits at ignition coil side of C54.
   Resistance should be about 4 ohms.
   If OK, service YEL/WHT circuit between ECM and C54 for an open.
   If not OK, service ignition coil.

Test H: Carburetor Air Jet (CAJ) Solenoid Valve #2 Input Test

1. Disconnect C120 (CAJ solenoid valve). Turn ignition ON and check for battery voltage at BLK/LT GRN circuit.
   If yes, go to step 2.
   If no, service BLK/LT GRN circuit for an open.
2. Connect ohmmeter across RED/WHT and BLK/LT GRN circuits (solenoid side).
   Resistance should be about 32 ohms.
   If yes, service RED/WHT circuits for an open between C120 and ECM.
   If no, replace CAJ solenoid valve.

Test I: Carburetor Air Jet (CAJ) Solenoid Valve #3 Input Test

1. Disconnect C119 (CAJ solenoid valve). Turn ignition ON and check for battery voltage at BLK/LT GRN circuit.
   If yes, go to step 2.
   If no, service BLK/LT GRN circuit for an open.
2. Connect ohmmeter across RED and BLK/LT GRN circuits (solenoid side).
   Resistance should be about 32 ohms.
   If yes, service RED circuits for an open between C119 and ECM.
   If no, replace CAJ solenoid valve.

Test J: Pulse Secondary Air Injection (PAIR) Solenoid Valve Input Test

1. Disconnect C315 (PAIR solenoid valve). Turn the ignition ON and check for battery voltage at BLK/LT GRN circuit (harness side).
   If yes, go to step 2.
   If no, service BLK/LT GRN circuit for an open.
2. Connect ohmmeter across BLK/RED and BLK/LT GRN circuits (solenoid side).
   Resistance should be about 32 ohms.
   If yes, service BLK/RED circuits for an open between C315 and ECM.
   If no, replace PAIR solenoid valve.

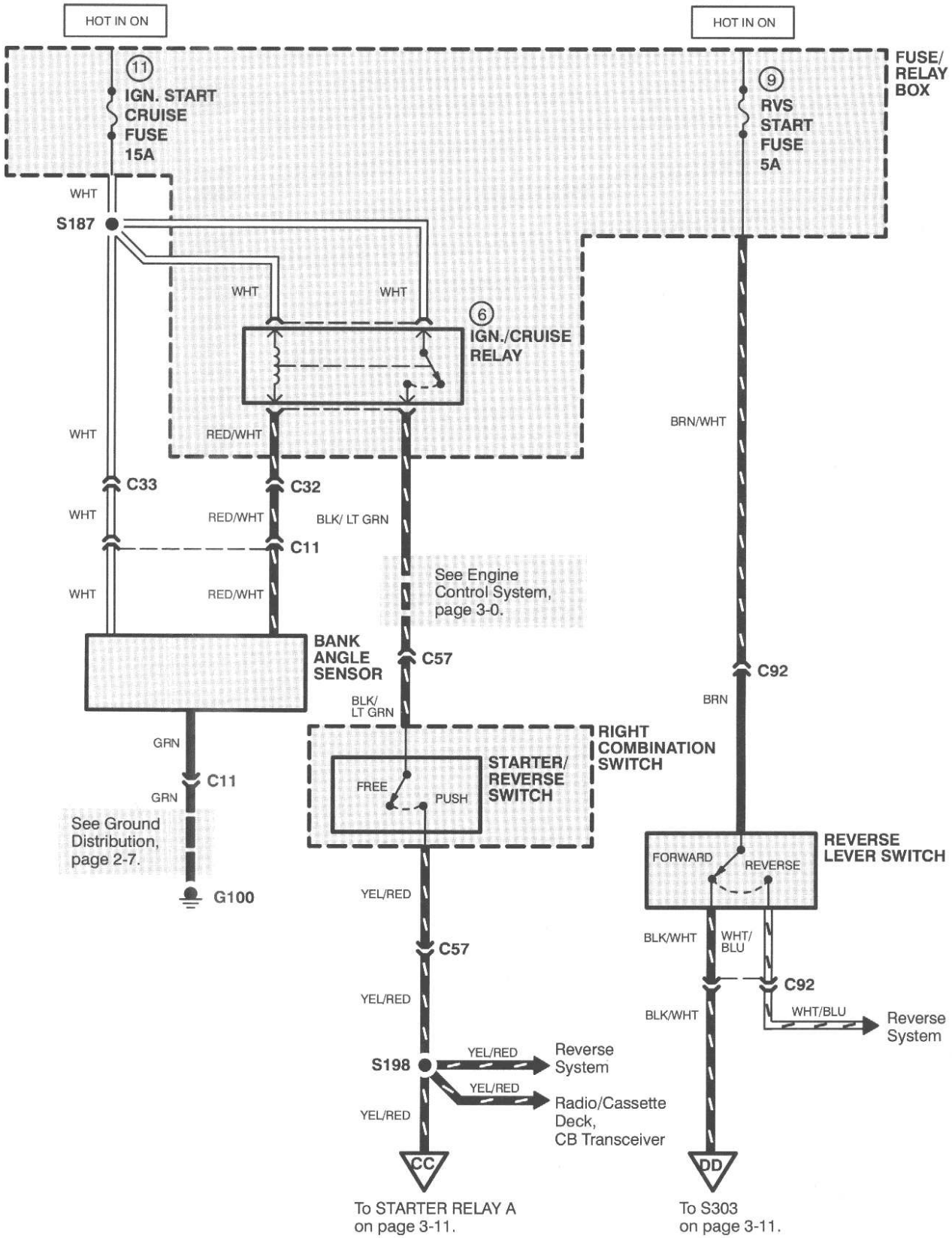
Test K: Engine Coolant Temperature (ECT) Sensor Input Test

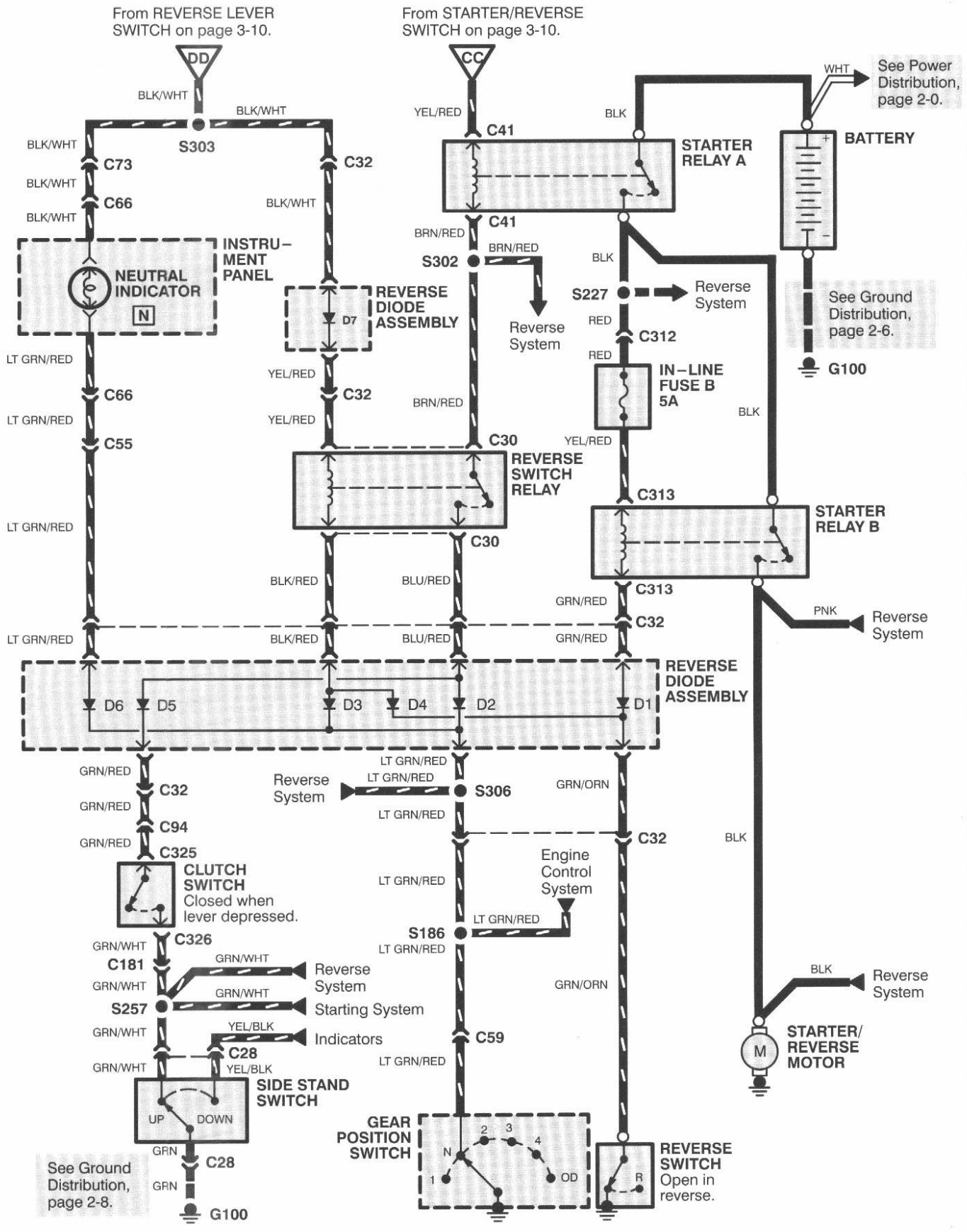
1. Disconnect coolant temperature sensor. Connect ohmmeter across sensor terminal. Resistance should be less than 2k-3k ohms at 68°F (20°C) and decrease with a temperature increase.
   If yes, check GRN/BLK and PNK/WHT circuits for an open between sensor and ECM.
   If no, replace sensor.

Test L: Intake Air Temperature (IAT) Sensor Input Test

1. Disconnect C314 (IAT sensor). Connect ohmmeter across sensor terminal. Resistance should be less than 2k-3k ohms at 68°F (20°C) and decrease with a temperature increase.
   If yes, check GRN/BLK and GRY circuits for an open between sensor and ECM.
   If no, replace sensor.

Circuit Schematic




From REVERSE LEVER SWITCH on page 3-10.
From STARTER/REVERSE SWITCH on page 3-10.
DD
CC
BLK/WHT
S303
C73
C66
C32
INSTRU-MENT PANEL
NEUTRAL INDICATOR
N
REVERSE DIODE ASSEMBLY
D7
LT GRN/RED
YEL/RED
BRN/RED
S302
Reverse System
C41
STARTER RELAY A
BLK
WHT
See Power Distribution, page 2-0.
BATTERY
S227
RED
C312
IN-LINE FUSE B 5A
See Ground Distribution, page 2-6.
G100
C30
REVERSE SWITCH RELAY
C313
STARTER RELAY B
BLK/RED
BLU/RED
GRN/RED
PNK
D6
D5
D3
D4
D2
D1
GRN/RED
C94
C325
CLUTCH SWITCH
Closed when lever depressed.
C326
C181
S257
Starting System
Indicators
C28
SIDE STAND SWITCH
UP
DOWN
GRN
See Ground Distribution, page 2-8.
S306
GRN/ORN
Engine Control System
S186
C59
GEAR POSITION SWITCH
N
1
2
3
4
OD
R
REVERSE SWITCH
Open in reverse.
M
STARTER/ REVERSE MOTOR

Starting System

How the Circuit Works

The starting system for the Asp and SE models is made up of the following components:

- Bank angle sensor
- Clutch switch
- Gear position switch
- Ignition/cruise relay
- Reverse diode assembly
- Reverse lever switch
- Reverse switch
- Reverse switch relay
- Side stand switch
- Starter relay A
- Starter relay B
- Starter/reverse motor
- Starter/reverse switch

The starter/reverse switch receives battery voltage from the IGN/cruise relay when the ignition is switched ON. The bank angle sensor supplies ground to the IGN/cruise relay.

- The starting system is activated when the driver presses and holds the starter/reverse switch.
- Voltage from the IGN/cruise relay is then sent through the reverse diode assembly, reverse switch relay coil, and gear position switch to ground.
- The reverse switch relay energizes and completes a ground path from the coil of starter relay A to ground through the reverse diode assembly, clutch switch, and the side stand switch.
- Starter relay A energizes and applies battery voltage to the coil and contacts of starter relay B when the reverse switch is in the FORWARD position.
- Starter relay B energizes and applies voltage to the starter/reverse motor. The starter motor turns to crank the engine.

Troubleshooting

SYMPTOM	DIAGNOSIS
• Starter and reverse systems do not operate but the neutral indicator operates.	• Weak battery or poor terminal connections. • Blown RVS Start fuse. • Open circuit at reverse lever switch or faulty starter/reverse motor; do test A2.
• Starter and reverse systems do not operate and the neutral indicator does not operate.	• Poor battery terminal connections. • Blown IGN Start Cruise fuse. • Open circuit or faulty bank angle sensor, IGN/cruise relay, starter relay A; do test A1.
• Starter operates in neutral, but not in gear with clutch lever depressed and side stand switch UP.	• Open circuit or faulty reverse diode assembly, clutch switch, or side stand switch; do test C1.
• Starter operates with clutch lever depressed and side stand switch UP, but not with clutch lever released and gear selector in NEUTRAL.	• Open circuit or faulty reverse diode assembly or gear position switch; do test D1.
• Neutral indicator does not light, but starter operates with clutch lever released.	• Open circuit to instrument panel bulb, bulb, or reverse diode assembly.

(cont'd)

Troubleshooting (cont'd)

TEST A1: Power and Ground Reverse Lever Switch Isolation

1. Disconnect C92 (reverse lever switch) and with ignition switch ON, check for battery voltage at BRN/WHT circuit.
   If yes, replace reverse lever switch.
   If no, service BRN/WHT circuit for an open or short to ground.

TEST A2: Power and Ground Isolation

1. Disconnect C57 (starter/reverse switch) and with ignition switch ON, check for battery voltage at BLK/LT GRN circuit.
   If yes, go to test A3.
   If no, go to test A4.

TEST A3: Power and Ground Starter Relay A Isolation

1. Reconnect C57 and disconnect C41 (starter relay A). With ignition switch ON, check for voltage at YEL/RED circuit with starter/reverse switch depressed.
   If yes, go to step 2.
   If no, service YEL/RED circuit for an open. If OK, replace starter/reverse switch.
2. Check for battery voltage at starter relay A BLK circuit from battery.
   If yes, go to step 3.
   If no, repair BLK circuit.
3. With ignition switch ON, gearshift in NEUTRAL, and reverse lever switch in the FORWARD position, check for voltage between BLK (battery feed) circuit and C41 BRN/RED using a test light.
   If yes, go to step 4.
   If no, sevice BRN/RED circuit for an open between starter relay A and S302.
4. Check for battery voltage across BLK circuits at starter relay A.
   If yes, go to step 5.
   If no, service BLK circuit between starter relay A and S227 for an open.
5. Reconnect C41 and disconnect BLK circuits at starter/reverse motor terminal. Connect test light at starter/reverse motor terminal. With ignition switch ON, reverse lever switch FORWARD and gearshift in NEUTRAL, press and hold starter/reverse switch. Test lamp should light.
   If yes, replace starter/reverse motor.
   If no, replace starter relay A.

TEST A4: Power and Ground IGN/Cruise Relay Isolation

1. Disconnect the IGN/cruise relay. With the ignition switch ON, check for battery voltage at both WHT circuits.
   If yes, go to step 2.
   If no, service WHT circuit for an open.
2. Check for battery voltage between WHT and RED/WHT circuits.
   If yes, go to step 3.
   If no, go to test A5.
3. Connect a fused jumper (15A) between WHT and BLK/LT GRN circuit at IGN/cruise relay and check fo battery voltage at BLK/LT GRN circuit at C57.
   If yes, replace IGN/cruise relay.
   If no, service BLK/LT GRN circuit.

TEST A5: Power and Ground Bank Angle Sensor Isolation

1. Reconnect the IGN/cruise relay. Disconnect C11 (bank angle sensor). Turn the ignition switch ON and check for battery voltage at RED/WHT circuit.
   If yes, go to step 2.
   If no, service RED/WHT circuit for an open.

2. Check for battery voltage at WHT circuit.
   If yes, go to step 3.
   If no, service WHT circuit for an open.

3. Check for battery voltage between WHT and GRN circuits.
   If yes, replace bank angle sensor.
   If no, service GRN circuit for an open.

TEST B1: Reverse Switch Relay Isolation

1. Disconnect C30 (reverse switch relay). With ignition switch ON and reverse lever switch in FORWARD, check for battery voltage at YEL/RED circuit.
   If yes, go to step 2.
   If no, go to test B2.

2. Check for battery voltage at BRN/RED circuit with starter/reverse switch depressed.
   If yes, go to step 3.
   If no, service BRN/RED circuit for an open.

3. Check for battery voltage between YEL/RED and BLK/RED circuits.
   If yes, go to step 4.
   If no, check BLK/RED circuit between reverse switch relay and reverse diode assembly for an open. If OK, replace reverse diode assembly.

4. Check for battery voltage between YEL/RED and BLU/RED circuits.
   If yes, go to step 5.
   If no, check BLU/RED circuit between reverse switch relay and reverse diode assembly for an open. If OK, replace reverse diode assembly.

5. With ignition switch ON, gearshift in NEUTRAL, and reverse lever switch in FORWARD, connect a fused jumper (15A) between BRN/RED circuit at C30 and ground. The starter should crank.
   If yes, replace reverse switch relay.
   If no, go to test B4.

TEST B2: Reverse Diode Assembly Isolation

1. Disconnect reverse diode assemby connector. With ignition switch ON and reverse lever switch in FORWARD, check for battery voltage at BLK/WHT (diode D7) circuit.
   If yes, go to step 2.
   If no, go to test B3.

2. Check for continuity at YEL/RED circuit between reverse diode assembly and reverse switch relay.
   If yes, replace reverse diode assembly.
   If no, service YEL/RED circuit.

(cont'd)

Troubleshooting (cont'd)

TEST B3: Reverse Lever Switch Isolation

1. Check continuity at BLK/WHT circuit between reverse switch lever and reverse diode assembly.
   If yes, replace reverse lever switch.
   If no, service BLK/WHT circuit for an open.

TEST B4: Starter Relay B Isolation

1. Reconnect any components disconnected in previous tests. Disconnect C313 (starter relay B connector). With ignition switch ON and reverse lever in FORWARD, depress starter/reverse switch while checking for battery voltage at BLK (starter relay A feed) circuit.
   If yes, go to step 2.
   If no, service BLK circuit for an open.
2. Depress starter/reverse switch while checking for battery voltage at YEL/RED circuit.
   If yes, go to step 3.
   If no, check in-line fuse B, YEL/RED, and RED circuits for an open.
3. Depress starter/reverse switch while checking for battery voltage between YEL/RED and GRN/RED circuits.
   If yes, go to step 4.
   If no, go to test B5.
4. Jumper the BLK and BLK (with PNK) circuits at starter relay B. With gear selector in NEUTRAL and reverse lever switch in FORWARD, depress starter/reverse switch. Starter motor should crank.
   If yes, replace starter relay B.
   If no, service BLK circuit between starter motor and starter relay B for an open.

TEST B5: Reverse Diode Assembly Isolation

1. Check GRN/RED circuit continuity between starter relay B and reverse diode assembly.
   If yes, go to step 2.
   If no, service GRN/RED circuit for an open.
2. With reverse switch in FORWARD, check continuity between GRN/ORN circuit and ground.
   If yes, replace reverse diode assembly.
   If no, check reverse switch and GRN/ORN circuit.

TEST C1: Clutch Switch Isolation

1. Disconnect C326 (clutch switch connector). With side stand switch UP, check continuity of GRN/WHT circuit to ground.
   If yes, go to step 2.
   If no, check GRN/WHT circuit, side stand switch, and GRN circuit at C28 for an open.
2. Disconnect C325 (clutch switch connector). Check continuity across clutch switch with clutch lever depressed.
   If yes, check GRN/RED circuit for an open. If OK, replace reverse diode assembly.
   If no, replace clutch switch.

TEST D1: Gear Position Switch Isolation

1. Disconnect C59 (gear position switch) and jumper LT GRN/RED circuit to ground. With side stand switch DOWN, reverse switch in FORWARD, and ignition switch ON, press starter/reverse switch. Starter should crank.
   If yes, replace gear position switch.
   If no, check LT GRN/RED circuit for an open between gear position switch and reverse diode assembly. If circuit is OK, replace reverse diode assembly.

TEST E1: Power and Ground Isolation

1. Disconnect C57 (starter switch) and with ignition switch ON, check for battery voltage at BLK/LT GRN circuit.
   If yes, go to test E2.
   If no, go to test E3.

TEST E2: Power and Ground Starter Relay A Isolation

1. Reconnect C57 and disconnect C41 (starter relay A). With ignition switch ON, check for voltage at YEL/RED circuit with starter switch depressed.
   If yes, go to step 2.
   If no, check YEL/RED circuit for an open. If OK, replace starter switch.

2. Check for battery voltage at starter relay A BLK circuit from battery.
   If yes, go to step 3.
   If no, repair BLK circuit.

3. With ignition switch ON and gearshift in NEUTRAL, check for voltage between BLK (battery feed) circuit and C41 BRN/RED using a test light.
   If yes, go to step 4.
   If no, service BRN/RED circuit for an open between starter relay A and S373.

4. Reconnect C41 and disconnect BLK circuit at starter motor terminal. Connect test light at starter motor terminal. With ignition switch ON and gearshift in NEUTRAL, press and hold starter switch. Test lamp should light.
   If yes, replace starter motor.
   If no, check BLK circuit for an open. If OK, replace starter relay A.

TEST E3: Power and Ground IGN Relay Isolation

1. Disconnect the IGN relay. With the ignition switch ON, check for battery voltage at both WHT circuits.
   If yes, go to step 2.
   If no, service WHT circuit for an open.

2. Check battery voltage between WHT and RED/WHT circuits.
   If yes, go to step 3.
   If no, go to test E4.

3. Connect a fused jumper (15A) between WHT and BLK/LT GRN circuit at IGN relay and check for battery voltage at BLK/LT GRN circuit at C57.
   If yes, replace IGN relay.
   If no, service BLK/LT GRN circuit.

Troubleshooting (cont'd)

TEST E4: Power and Ground Bank Angle Sensor Isolation

1. Reconnect the IGN relay. Disconnect C11 (bank angle sensor). With the ignition switch ON, check for battery voltage at RED/WHT circuit.
   If yes, go to step 2.
   If no, service RED/WHT circuit for an open.
2. Check battery voltage at WHT circuit.
   If yes, go to step 3.
   If no, service WHT circuit for an open.
3. Check for battery voltage between WHT and GRN circuits.
   If yes, replace bank angle sensor.
   If no, service GRN circuit for an open.

TEST F1: Clutch Switch Isolation

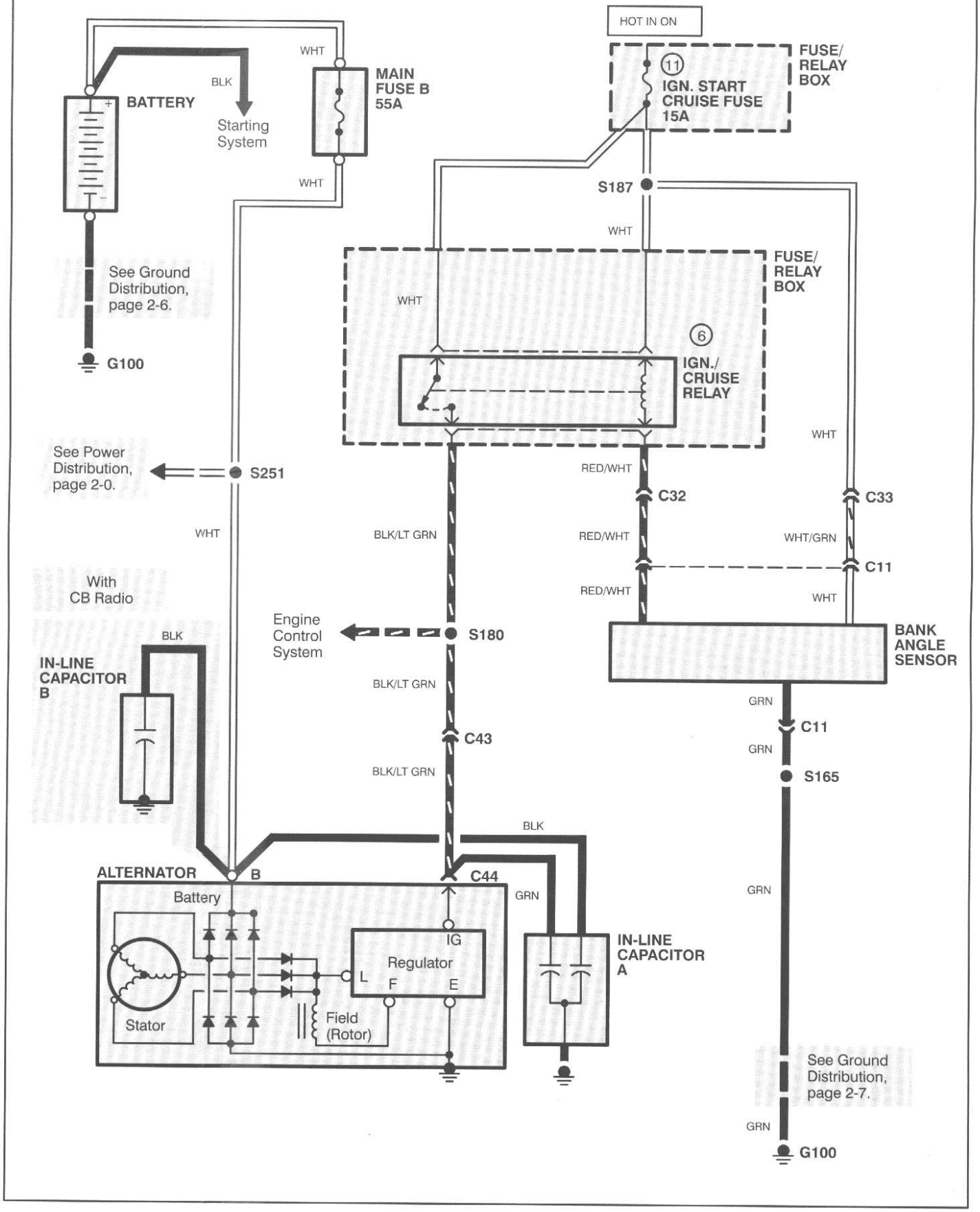
1. Disconnect C325 (clutch switch connector). With side stand switch UP, check continuity of GRN/WHT circuit to ground.
   If yes, go to step 2.
   If no, check GRN/WHT circuit, side stand switch, and GRN circuit at C28 for an open.
2. Disconnect C326 (clutch switch connector). Check continuity across clutch switch with clutch lever depressed.
   If yes, check GRN/RED circuit in-line diode C and BRN/RED circuit for an open.
   If no, replace clutch switch.

TEST G1: Gear Position Switch Isolation

1. Disconnect C59 (gear position switch) and jumper LT GRN/RED circuit to ground. With side stand switch DOWN and ignition switch ON, press starter/reverse switch. Starter should crank.
   If yes, replace gear position switch.
   If no, check LT GRN/RED circuit in-line diode A and BRN/RED circuit for an open.

Charging System

Circuit Schematic



How the Circuit Works

The alternator generates an alternating current (AC) voltage in its windings as it is driven by the engine. The integral regulator/rectifier converts this AC voltage into direct current (DC) voltage to maintain battery charge and operate the electrical system.

When the engine is running, battery voltage is supplied to the alternator regulator through the BLK/LT GRN circuit. The alternator then supplies voltage to the battery and electrical system through the WHT circuit. Capacitors are connected to each alternator terminal to reduce alternator electrical noise.

Troubleshooting

SYMPTOM	DIAGNOSIS
• Battery is overcharged or undercharged.	• Blown main fuse B. • Open WHT circuit to battery; open circuit to regulator/rectifier or faulty alternator; do test A.

TEST A : Power and Ground Check

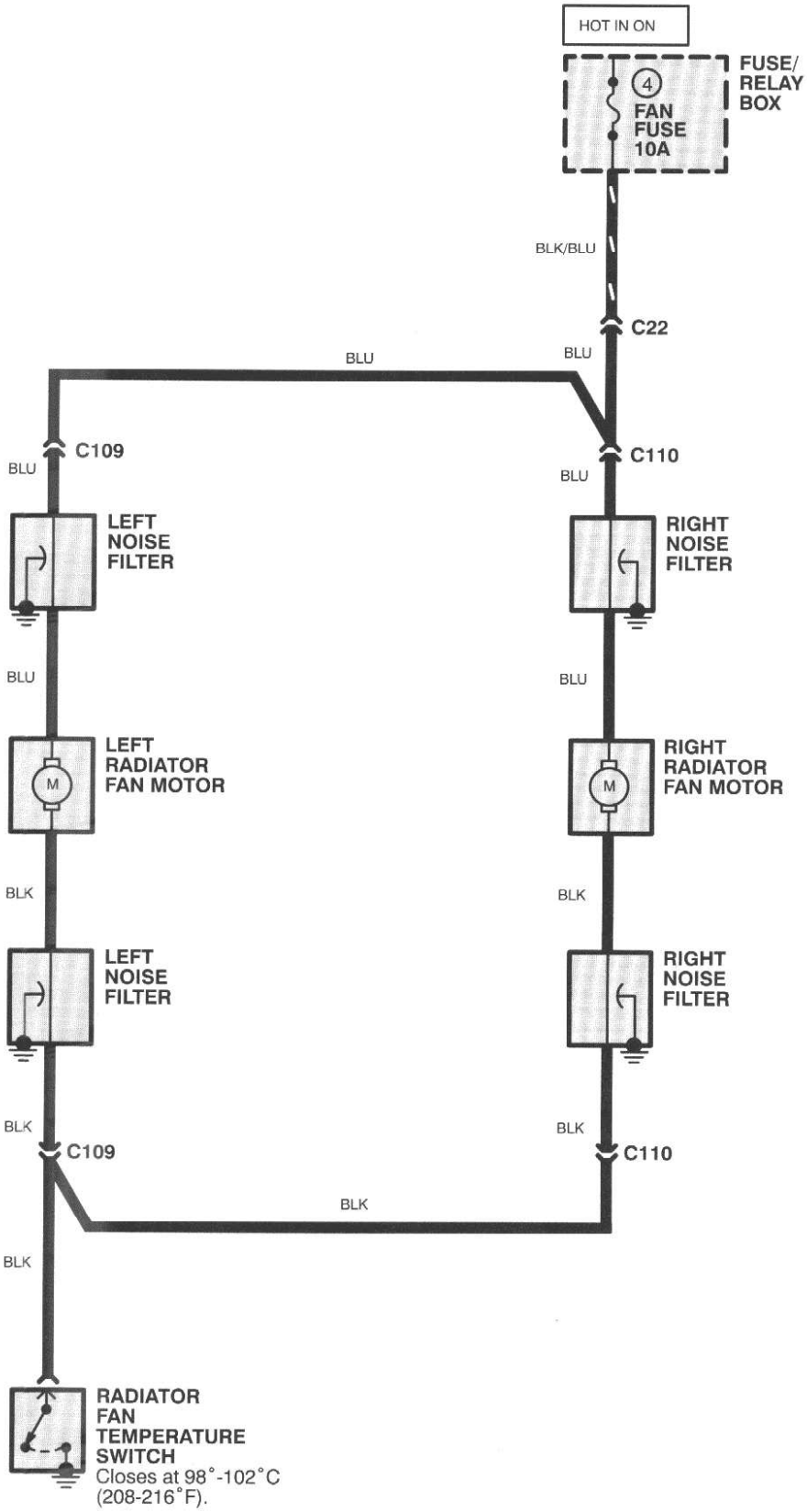
1. Check for battery voltage at alternator terminal B.
   If yes, go to step 2.
   If no, service WHT circuit for an open.

2. Disconnect C44 (alternator) connector. Turn ignition switch ON and check for battery voltage at BLK/LT GRN circuit.
   If yes, go to step 3.
   If no, service BLK/LT GRN circuit for an open.

3. Reconnect C44 and start the engine. Measure voltage across the battery terminals. It should measure between 13.5 and 15.5 volts.
   If yes, perform a battery load test. See service manual, charging section.
   If no, service or replace alternator. See service manual, charging section.

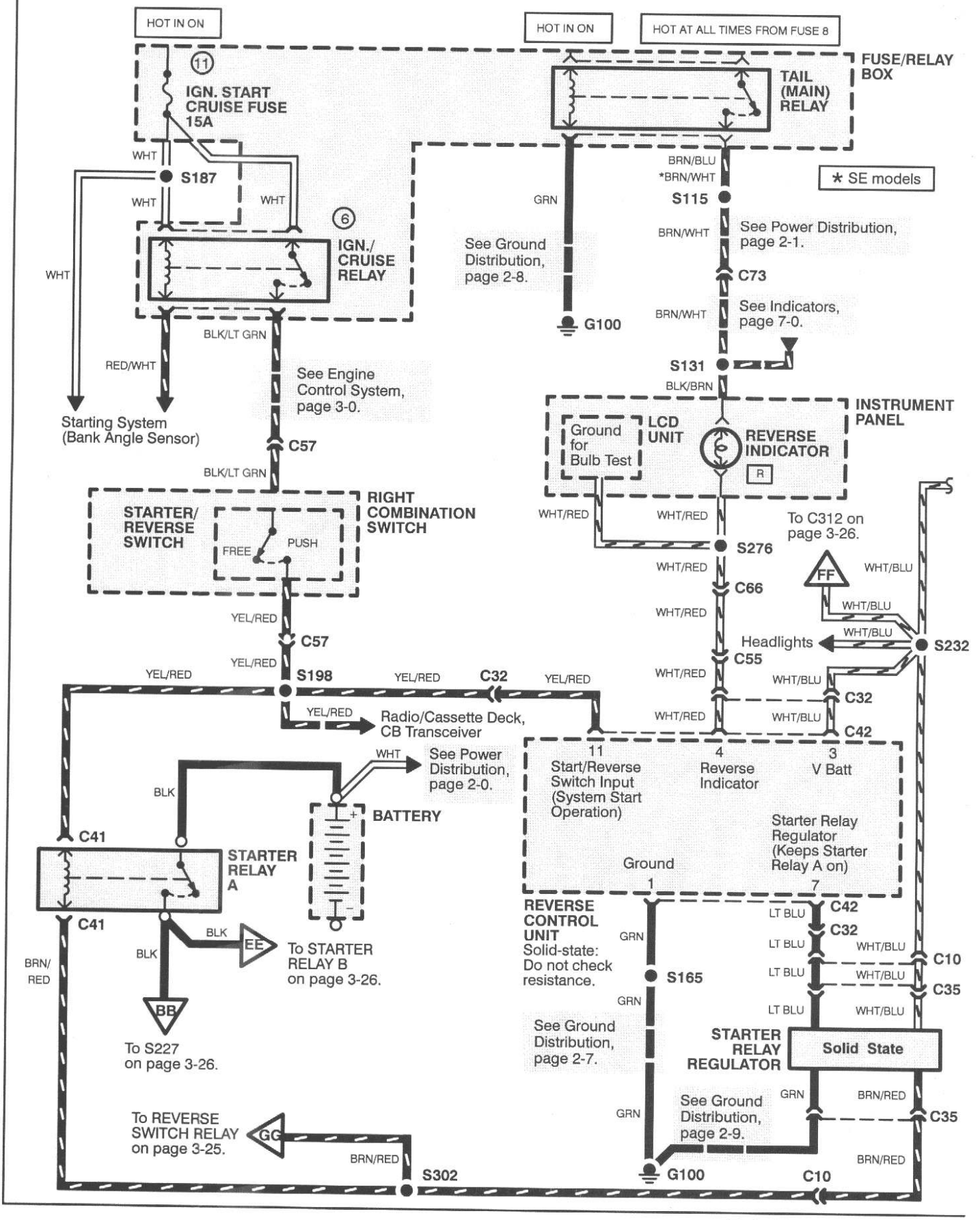
Radiator Fans

Circuit Schematic



Reverse System

Circuit Schematic



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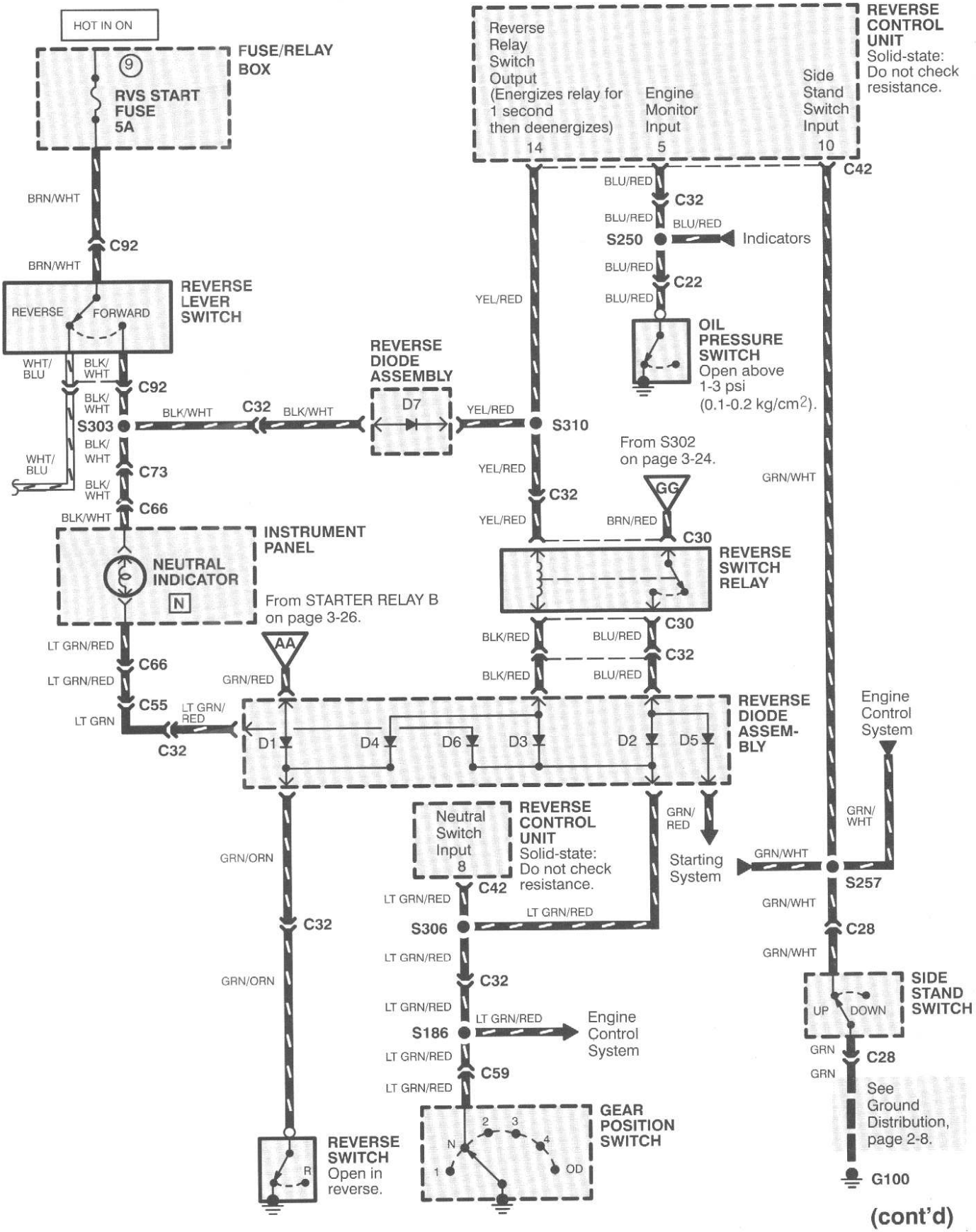
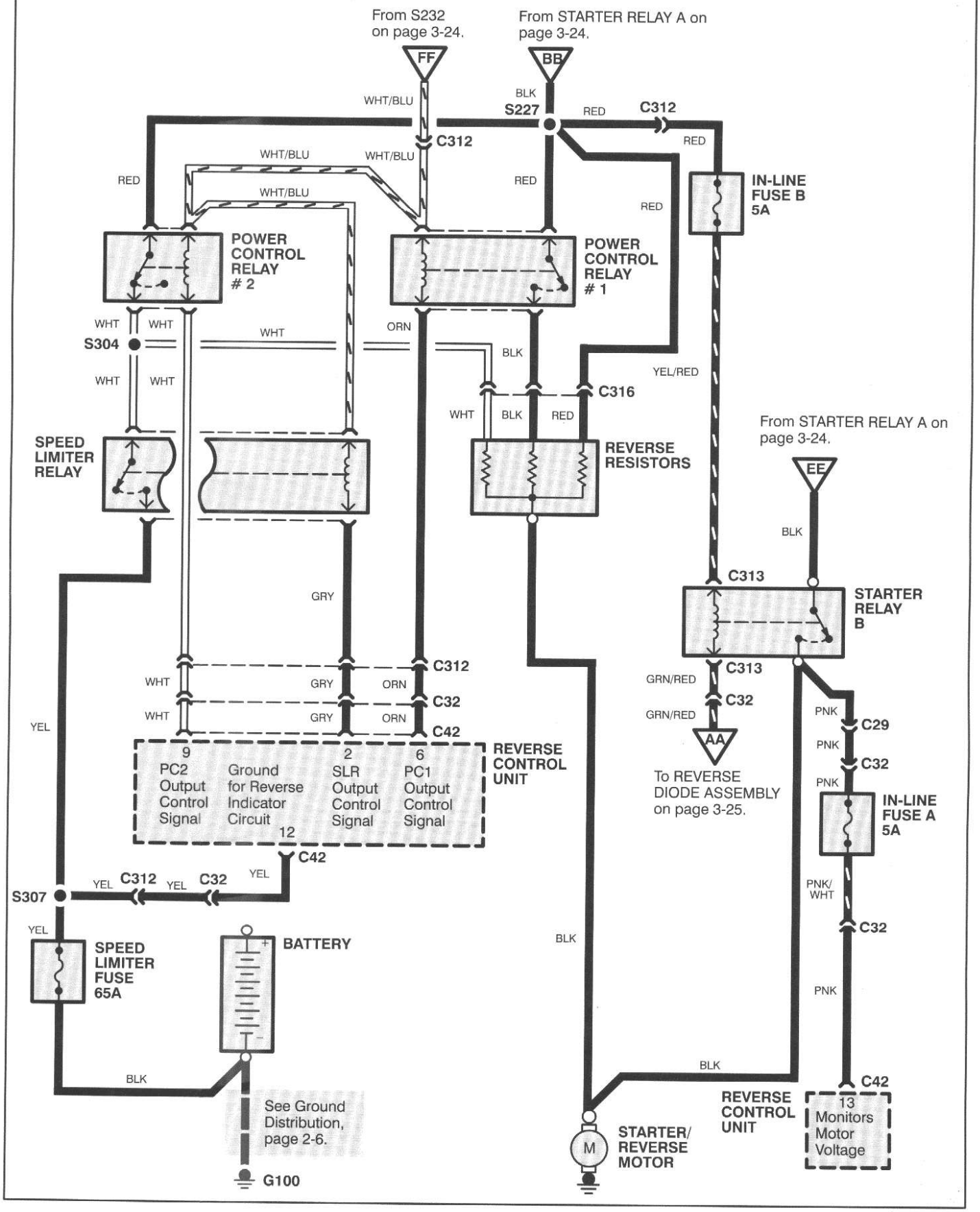
MSV 8022 (9803)


HOT IN ON
FUSE/RELAY BOX
9
RVS START FUSE 5A
BRN/WHT
C92
BRN/WHT
REVERSE LEVER SWITCH
REVERSE
FORWARD
WHT/BLU
BLK/WHT
C92
BLK/WHT
S303
BLK/WHT
C73
BLK/WHT
C66
BLK/WHT
INSTRUMENT PANEL
NEUTRAL INDICATOR
N
From STARTER RELAY B on page 3-26.
LT GRN/RED
C66
LT GRN/RED
C55
LT GRN
LT GRN/RED
C32
BLK/WHT
C32
BLK/WHT
REVERSE DIODE ASSEMBLY
D7
YEL/RED
S310
Reverse Relay Switch Output (Energizes relay for 1 second then deenergizes)
14
Engine Monitor Input
5
Side Stand Switch Input
10
REVERSE CONTROL UNIT
Solid-state: Do not check resistance.
C42
BLU/RED
C32
BLU/RED
BLU/RED
S250
Indicators
BLU/RED
C22
BLU/RED
OIL PRESSURE SWITCH
Open above 1-3 psi (0.1-0.2 kg/cm2).
YEL/RED
From S302 on page 3-24.
YEL/RED
C32
YEL/RED
GG
BRN/RED
C30
GRN/WHT
REVERSE SWITCH RELAY
C30
BLK/RED
BLU/RED
C32
BLK/RED
BLU/RED
AA
GRN/RED
REVERSE DIODE ASSEMBLY
D1
D4
D6
D3
D2
D5
Engine Control System
GRN/WHT
GRN/ORN
C32
GRN/ORN
Neutral Switch Input 8
REVERSE CONTROL UNIT
Solid-state: Do not check resistance.
C42
LT GRN/RED
S306
LT GRN/RED
GRN/RED
Starting System
GRN/WHT
S257
GRN/WHT
C28
GRN/WHT
LT GRN/RED
C32
LT GRN/RED
S186
LT GRN/RED
Engine Control System
LT GRN/RED
C59
LT GRN/RED
GEAR POSITION SWITCH
N
1
2
3
4
OD
REVERSE SWITCH
Open in reverse.
R
SIDE STAND SWITCH
UP
DOWN
GRN
C28
GRN
See Ground Distribution, page 2-8.
G100
(cont'd)

Reverse System

Circuit Schematic (cont'd)



How the Circuit Works

The reverse control unit takes a series of inputs from external switches and also monitors voltage developed at the starter/reverse motor to determine what outputs should be controlled to make reverse direction possible.

When the reverse lever switch is in the REVERSE position, battery voltage is applied to pin 3 (WHT/BLU) and ground is provided on pin 1 (GRN) from G100.

System Check

If power and ground are OK, the reverse control unit then starts a system check to look for the following:

- Battery voltage applied to pin 5 (BLU/RED) when the engine is started and oil pressure is above 1-3 psi.
- Ground present at pin 8 (LT GRN/RED) when the gearshift sensor is in NEUTRAL.
- Ground present at pin 10 (GRN/WHT) when the side stand switch is in the UP position.
- Ground present on pin 12 (YEL), providing a ground for the reverse indicator and to establish that the speed limiter fuse is good.

When the reverse indicator has been illuminated, the driver knows the system is ready for operation. The driver presses the starter/reverse switch and battery voltage is applied to pin 11 (YEL/RED) of the reverse control unit. As this input is received, a set of outputs starts controlling other system components.

- The reverse control unit provides 9 volts for one second on pin 14 (YEL/RED) to briefly energize the reverse relay switch. The reverse relay switch contacts close to provide a one second path to ground. This pulls the contacts of starter relay A closed.
- At the same time that pin 14 outputs to the reverse relay switch, the reverse control unit grounds pin 7 (LT BLU), which grounds the starter relay regulator. This provides the hold-in current path (BRN/RED) to keep the contacts of starter relay A closed while the starter/reverse switch is pushed.
- Pin 6 (ORN) is grounded by the reverse control unit when the starter/reverse switch is pushed and minimum load is applied to the motor.
- Pin 9 (WHT) is grounded when maximum load is applied to the motor.

System Reset

System reset is required when vehicle speed exceeds 2.5 km/h or when the starter/reverse motor has experienced an electrical motor brake of three seconds or more. The reverse control unit monitors the starter/reverse motor's voltage, and if it determines an excessive speed, it grounds pin 2 (GRY), allowing the speed limiter relay's contacts to close. This removes some of the voltage to the starter/reverse motor.

If it determines an electrical motor brake, then the control unit removes all power to the starter/reverse motor by de-energizing starter relay A. The reverse control unit also provides battery voltage to pin 4 (WHT/RED), turning the reverse indicator off. Before the system may be operated again, the reverse lever switch must be recycled back to the forward position, applying battery voltage to pin 14 (YEL/RED).

Reverse System

Troubleshooting

SYMPTOM	DIAGNOSIS
• Reverse system doesn't operate and the reverse indicator doesn't light.	• No power to reverse control unit; do self-test A, pin 3. • No ground to control module; do self-test B, pin 1. • Bad side stand switch input; do self-test B, pin 10. • No neutral position input from gearshift sensor; do self-test B, pin 8. • Incorrect oil pressure switch input; do self-test A, pin 5. • Bad speed limiter fuse (65A); do self-test B, pin 12. • Faulty reverse control unit. Replace with known good reverse control unit.
• Reverse system operates for only a few seconds, then quits. Reverse indicator turns off or reverse system doesn't operate and the reverse indicator lights.	• No voltage to starter/reverse motor; do self-test A, pin 13. • No control signal to reverse control unit from starter/reverse switch; do self-test A, pin 11. • No control signal from reverse control unit to reverse relay switch; do self-test A, pin 14. • No control signal from reverse control unit to starter relay regulator; do self-test A, pin 7.

SYMPTOM	DIAGNOSIS
• Reverse system operates, but very slowly or no power on inclines.	• Faulty control signal from reverse control unit to power relay control #1; do self-test A pin 6. • Faulty control signal from reverse control unit to power relay control #2; do self-test A pin 9. • Inoperative power relays; do self-test F. • If all the above are OK, check red circuits to power relay controls for battery voltage with ignition ON, starter reverse switch in REVERSE, and the starter/reverse switch pushed. If voltage is not present, service circuits for an open.
• Reverse system operates above 2.5 km/h down inclines.	• Inoperative speed limiter relay; do self-test A pin 2.
• Reverse system operates, but reverse indicator doesn't light.	• No control signal from reverse control unit indicator; do self-test A pin 4.

(cont'd)

Troubleshooting (cont'd)

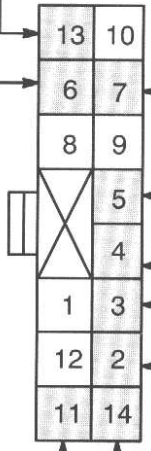
SELF-TEST A: Static Measurements

Note: Leave C42 **connected** to reverse control unit.
Make all measurements between pin # given in domestic table and ground (pin #1).

Starter Reverse Motor Input (PNK)
Varying voltage present with ignition switch in ON, reverse lever switch in REVERSE and starter reverse switch pushed.
If not, check in-line fuse A (5 amp).
If fuse is good, check circuit for an open.
If all measurements are good, do self-test A pin 11.

Starter Relay Regulator Output (LT BLU)
Voltage drops from 1.5 volts to 0 volts with the engine running, reverse lever switch in REVERSE and the starter/reverse switch pushed.
If not, replace the reverse control unit.

C42
(HARNESS SIDE)



Oil Pressure Switch Input (BLU/RED)
0 volts with ignition switch ON.
If not, check to see if oil pressure indicator operates.
If so, service BLU/RED circuit for an open.
If oil pressure indicator dosen't light, replace oil pressure switch.

Power Relay Control #1 Output (ORN)
Battery voltage with ignition switch ON and reverse lever switch in REVERSE.
If not, replace reverse control unit.
Lightly apply rear brake. Voltage should drop .5 volts. If not, replace reverse control unit.
If both measurements are correct, go to self-test F.

Reverse Indicator Output (WHT/RED)
With ignition ON, see if indicator illuminates for bulb test.
0 volts present with the reverse system in operation.
If not, replace the reverse control unit.
If so, short WHT/RED circuit to ground and if indicator dosen't illuminate, service WHT/RED circuit for an open.

Starter/Reverse Switch Input (YEL/RED)
Battery voltage with ignition switch ON and starter/reverse switch depressed.
If not, service YEL/RED circuit for an open.
If measurements are correct, go to the next diagnostic step.

Reverse Lever Switch Input (WHT/BLU)
Battery voltage with ignition switch ON and reverse lever switch in REVERSE.
If not, do self-test C.

Reverse Relay Switch Input/Output (YEL/RED)
Battery voltage with reverse lever switch in FORWARD.
If not, do self-test C.
9 volts for approximately 1 second with starter reverse switch pushed.
If not, replace control unit.
If all measurements are correct, service YEL/RED circuit for an open.

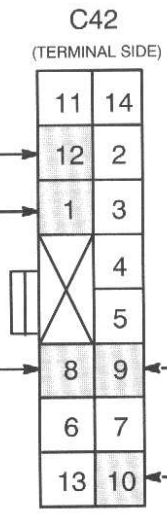
Speed Limiter Relay Control (GRY)
Battery voltage with ignition switch ON, reverse lever switch in REVERSE and starter/ reverse switch pushed.
If not, replace reverse control unit.
Push cycle on level ground to exceed 2.5 km/h while in reverse operation; voltage will drop to below .5 volts.
If not, replace reverse control unit.
If all measurements are correct, go to self-test G.

SELF-TEST B: Continuity Test

Note: **Disconnect** C42 from reverse control unit.
Make measurements between G100 (terminal) and desired pin on connector C42.

Speed Limiter Fuse (65 amp) Input (YEL)
Check for continuity to ground G100.
If bad, check speed limiter fuse (65 amp).
If good, check (YEL) or (BLK) circuit for an open.
If all measurements are good, go to the next diagnostic step.

Power Relay Control #2 Output (WHT)
Battery voltage with ignition switch ON and reverse lever switch in REVERSE.
If not, replace reverse control unit.
Fully apply rear brake. Voltage should drop below .5 volts.
If not, replace reverse control unit.
If both measurements are correct, do self-test F.



Ground Input (GRN)
Check for continuity to ground G100.
If there is no continuity, repair GRN circuit for an open.
If OK, go to the next diagnostic step.

Neutral Switch Input (LT GRN/RED)
With transmission in neutral, check for continuity to ground.
If not, check LT GRN/RED circuit for an open.
If OK, see if neutral indicator illuminates in bulb test and then stays illuminated.
If bulb doesn't light during bulb test, replace bulb.
If bulb only lights for bulb test, do self-test E.

Side Stand Switch Input (GRN/WHT)
With side stand in UP, continuity should exist to ground G100.
If not, check GRY/WHT circuit for an open.
If OK, go to self-test D.

(cont'd)

Troubleshooting (cont'd)

SELF-TEST C: Reverse Lever Switch

Note: Consult service manual for mechanical operations and alignment.

1. With transmission in NEUTRAL and reverse lever switch in FORWARD, see if the neutral indicator lights.
   If yes, go to step 3.
   If no, go to the next step.
2. Check for battery voltage at BRN/WHT circuit of reverse lever switch connector C92.
   If yes, go to the next step.
   If no, service BRN/WHT circuit for an open.
3. With C92 disconnected, check continuity between:
   - BRN and BLK/WHT circuits with reverse lever switch in FORWARD
   - BRN and WHT/BLU circuits with reverse lever switch in REVERSE

   If no continuity exists, replace reverse lever switch.
   If all measurements are OK, go to the next step.
4. Service WHT/BLU circuit for an open.

SELF-TEST D: Side Stand Switch

1. With the ignition ON and side stand DOWN, check to see if side stand indicator lights.
   If yes, go to step 3.
   If no, go to the next step.
2. With C28 disconnected, check for continuity between GRN circuit and ground G100.
   If yes, go to the next step.
   If no, service GRN circuit for an open.
3. Disconnect C28 and check continuity between GRN/WHT and GRN circuits on switch side of connector with side stand switch DOWN.
   If yes, go to the next step.
   If no, replace side stand switch.
4. With C28 still disconnected, check continuity between YEL/BLK and GRN circuits.
   If no, replace side stand switch.

SELF-TEST E: Gear Position Switch Test

1. Disconnect C59. With the transmission in NEUTRAL, check continuity between LT GRN/RED circuit and ground.
   If not, replace the gear position switch.

SELF-TEST F: Power Relay Control Test

With suspected relay disconnected, apply 12 volts across coil and measure continuity across contacts.

- Power relay control #1 – continuity exists
- Power relay control #2 – continuity does not exist

If incorrect, replace relay.
If OK, go to next step.

2. Power relay control #1; check continuity of BLK circuit from contacts and repair if necessary.
   Power relay control #2; check continuity of WHT circuit from contacts and repair if necessary.
   If all measurements are OK, go to self-test H.

SELF-TEST G: Speed Limiter Relay Test

1. With relay disconnected, apply 12 volts across the coil and measure continuity across contacts; continuity should exist.
   If not, replace speed limiter relay.
   If OK, go to next step.

2. Check continuity of WHT circuit and YEL circuit from contacts and repair if necessary.
   If OK, go to self-test H.

SELF-TEST H: Reverse Resistors

1. Disconnect starter/reverse motor terminal connector from reverse resistors.

2. Disconnect connector C316 and measure between all wires and terminal from previous step.

3. If resistance is above 2 ohms for any measurement, replace reverse resistors.